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TRANSACTIONS

OF THE

MINNESOTA STATE MEDICAL SOCIETY

1896

INCORPORATED 1892

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M. M.S.
10/12/98.

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Mc Gill
459 Cedar

Curtis 355 Minn.

Rich & Clymer
65 E 5

Smyth
35 E 3d

Banning
24 West 4th

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TRANSACTIONS

—OF THE—

MINNESOTA

STATE MEDICAL SOCIETY.

1896.

ST. PAUL:
NORTHWESTERN LANCET.
1896.

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OFFICERS OF THE SOCIETY.

PRESIDENT:
W. D. FLINN, M. D.

FIRST VICE-PRESIDENT:
DAVID OWEN THOMAS, M. D.

SECOND VICE-PRESIDENT:
D. M. JONES, M. D.

THIRD VICE-PRESIDENT:
WILLIAMS, M. D.

SECRETARY:
IGNATIUS DONNELLY, JR., M. D.

TREASURER:
R. J. HILL, M. D.

CENSORS:

FOR THREE YEARS—A. J. STONE, M. D.
J. H. DUNN, M. D.

FOR TWO YEARS — E. J. DAVIS, M. D.
A. C. WEDGE, M. D.

FOR ONE YEAR — W. W. MAYO, M. D.
FRANKLIN STAPLES, M. D.

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COMMITTEES.

Executive Committee.

J. W. Andrews, Chairman.

E. J. Davis. C. O. Cooley.
H. A. Tomlinson. E. D. Steele.

Committee on Publication.

I. Donnelly, Jr., Chairman.

J. F. Baker. C. L. Greene.
E. J. Walsh. J. V. Hawkins.

Censors of Papers.

Frank Burton, Chairman.

A. G. Stoddard. Arthur Sweeney.

Legislative Committee.

J. B. McGaughey, Chairman.

J. P. Humes. S. C. McCormack.
J. A. Dubois. J. Clark Stewart.

New Members Committee.

H. M. Warkman, Chairman.

F. E Bissell. J. B. Robertson.
C. A. McCollum. C. H. Mayo.

Necrology Committee.

F. J. Cressey, Chairman.

J. H. Dorsey. J. M. Todd.
Charles Dolan. A. E. Spalding.

Nominating Committee.

W. H. Magie, Chairman.

O. C. Strickler. J. D. Simpson.
H. L. Taylor. S. W. Ranson.

Finance Committee.

J. A. Quinn, Chairman.

E. Phillips. C. G. Slagle.
F. M. Rose. C. E. Dampier.

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PROCEEDINGS

—OF THE—

TWENTY-EIGHTH ANNUAL MEETING

—OF THE—

MINNESOTA STATE MEDICAL SOCIETY.

ANNUAL MEETING, JUNE 17, 1896. The President, Dr. FRANK ALLPORT, of Minneapolis, in the chair.

Pres. ALLPORT: The meeting will please come to order. I will ask the Rev. Matt S. Hughes to lead us in prayer.

Rev. Matt S. Hughes, pastor of the Hennepin Avenue M. E. Church, then offered prayer.

Pres. ALLPORT: Ladies and Gentlemen of the Convention: To those of us who are acquainted with our worthy mayor, and who know the wisdom and manifest effect of his administration upon our city government, he needs no introduction, but to those who reside outside of our city I take pleasure in introducing to you Hon. Robert Pratt, our worthy mayor, who will now welcome you to our city.

Mayor Pratt's appearance was greeted with applause, and he addressed the convention as follows.

Mr. President and Gentlemen of the State Medical Society:

I am pleased to welcome you here this morning, and to congratulate you on the wisdom shown in selecting for your meeting place the most beautiful and lovely city in the country. We are all interested in your health. Your coming here is a sort of professional visit, but it illustrates, perhaps, the popular saying "It is more blessed to give than to receive." I feel a good deal better, and it costs less than it would if I were under the necessity of receiving a professional visit from you. The advance in medical science and surgery is something we are all interested in. This is, perhaps, illustrated by the gentleman, a physician, who said that he never had a case die on his hands. When asked to explain, he said when all hope was given up he turned it over to a specialist. (Laughter.) In welcoming you to our city, those of you who live outsite of the city, I only express what those here already know, that our hospitality will not be administered in homœopathic doses, and it will not be sugar-coated, but it will be genuine clear through. The city, or rather the doors of the city, are open; not the front doors only, but all the doors. The keys of the city you can have; you can take them without any danger. They are always turned over after each convention to the public department of our city. I am pleased to welcome you here, and I know you will be royally welcomed and entertained by the profession of this city. As a citizen I take great pride in extending to that profession a hearty greeting, and I trust that your meeting may be a benefit to you and the rest of us, and I ask you to come again. Thank you, gentlemen. (Prolonged applause).

Pres. ALLPORT: The next thing in the order of business is the reading of the minutes of the previous meeting. Shall we have the minutes of the last meetiug read?

Dr. MAGIE: I move the reading of the minutes of the last meeting be dispensed with.

The motion was seconded, and being voted upon, prevailed.

Dr. MCDAVITT: I move that the minutes be approved as they stand on the Secretary's book.

The motion was seconded and prevailed.

Pres. ALLPORT: The next thing in the order of business is the roll call. Will you have the roll called?

Dr. DUNSMOOR: I move that the roll call be dispensed with.

The motion being seconded and put to a vote, prevailed.

Pres. ALLPORT: The next business in order is the report of the Executive Committee. Dr. R. O. BEARD, of Minneapolis, Chairman of the Committee, will report.

Dr. R. O. BEARD, Chairman of the Executive Committee, then submitted the following report:

Mr. President, Ladies and Gentlemen:

Your Exective Committee begs to report that it has used its best offices for the attainment, so far as its duties extend, of a successful meeting of the Society. I regret to announce that it has not been

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possible to make as satisfactory arrangements with the railroads for reduced rates of transportation for the Society's members as could have been desired. This has been in part due to a misunderstanding between the Secretary and the Committee in regard to the assignment of this duty—a duty prior to last year's meeting, which has been assumed by the former. It has been in part, also, due to a control of the majority of the railroads running into Minneapolis by the Western Passenger Association, and to the adoption by that association of a new rule which requires a sixty days' notice of request for reduced rates. Unaware of that rule, neither the Secretary nor the Committee gave this notice. When application was made to the railroads for excursion rates, it was met by a refusal upon the part of the associated roads. The Great Northern, the Northern Pacific and the Soo lines have, however, offered a rate of one fare and one-third. To obtain this rate, one hundred members must have been in actual attendance by rail. It is conditioned upon the holding of a receipt from the agent from whom the ticket was purchased; this receipt must be countersigned by the Secretary, Dr. IGNATIUS DONNELLY, and must be presented to the local agents when the return trip ticket is secured.

The Committee desires to announce in behalf of a number of firms who propose to exhibit materials, preparations, instruments, etc., at this meeting, that suitable arrangements for these exhibits have been made with the Crolius, Tucker & Allen Company, Fifth Street South, (half a block from the hotel), for the occupation of the front part of its store for this purpose. These exhibitors will be favored by frequent visits from the members of the Society.

Invitation to attend this meeting has been extended by the Committee to four or five distinguished members of the profession resident in other states. The Society will share the disappointment of the Committee that one or two of these expected guests have been compelled to withdraw their acceptance of this invitation, while it will welcome the remaining visitors.

Request has been made for an announcement of the Committee upon New Members. It consists of Dr. R. N. JACKSON, chairman; Dr. A. B. CATES, Dr. H. SNEVE, Dr. J. W. ANDREWS and Dr. C. A. STEWART. Nominations for membership should be handed to any member of this committee. The Executive Committee has to present to the Society the following invitation, addressed to Dr. FRANK ALLPORT, President:

"MY DEAR DOCTOR: I have been instructed by the Executive Committee of the Mississippi Valley Medical Association to invite the members of the Minnesota State Medical Association to attend the meeting of the Mississippi Valley Medical Association, which is to be held in St. Paul on October 20, 21, 22 and 23. I shall be greatly obliged if you will make this public at the meeting of the Society. Very truly yours,

HANAU W. LOEB, Secretary.

The Committee has also to present the following invitation from the University of Minnesota, through its President:

"MINNEAPOLIS, MINN., June 13, 1896.

"Dr. R. O. Beard, Chairman of the Executive Committee of the State Medical Society, Minneapolis, Minn.:

"MY DEAR SIR:—Representing the Board of Regents of the University of Minnesota, I take pleasure in extending to the State Medical Society an invitation to visit the University on Thursday, June 18, at twelve o'clock. I shall hope to greet the members of the Society, individually and in a body, at that time. Sincerely yours,

"CYRUS NORTHROP, President."

Your committee has so far accepted this invitation, on behalf of the Society, as to permit the necessary arrangements to be made for the entertainment of the University's guests. Special electric cars are tendered for the conveyance of the members to the campus. At the Library Building they will be met and addressed by the President, and, it is expected, by members of the Board of Regents. They will then be invited to inspect the buildings and to lunch in the Laboratory of Medical Sciences. Electric cars will return them to the West Hotel in season for the afternoon session. It is hoped that the Society will unanimously accept this invitation. It is proposed that the cars shall start for this trip from the West Hotel promptly at 11:30 A. M., if the business of the morning session is completed at that hour.

The Committee is requested to announce that the Hennepin County Medical Society will do itself the honor to entertain the Minnesota State Medical Society at a "Smoke Social" to be given on Friday, June 19, at 8 P. M., in the West Hotel. A very cordial invitation is extended by the County Society to every member to attend this event, which it is hoped will prove to be an evolutionary projection upon the old-time banqueting-board.

Tickets for the Smoke Social can be obtained from Dr. W. A. JONES, President of the Hennepin County Society, and from the Chairman of this Committee. Respectfully submitted.

R. O. BEARD, Chairman.

Pres. ALLPORT: Gentlemen, you have heard the report of the Executive Committee; what will you do with it?

Dr. DUNSMOOR: I move the report be accepted.

The motion was seconded and on vote prevailed.

Pres. ALLPORT: We will now listen to the report of the Treasurer, Dr. HILL.

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Dr. R. J. HILL, Treasurer, Minneapolis, presented the following report:

R. J. HILL, TREASURER, IN ACCOUNT WITH THE MINNESOTA STATE MEDICAL SOCIETY.

1895.	Dr.		
To Amount on hand June 19, 1895....		$394.46	
To amount collected at Annual Meeting		314.00	
To amount collected for delinquent dues		644.50	
Total.....			$1,352.96
	Cr.		
By amount paid janitor Court House, Duluth.....			$ 10.00
June 21.	By amount paid A. G. Long, stenographer.....		43 00
21.	" " W. H. Magie, Chairman Ex. Com.....		59.75
21.	" " J. E. Moore, Chairman Sec. Surgery.....		5.00
21.	" " A. E. Spalding, Chm. Sec. Obstetrics.....		5.00
21.	" " R. M. Phelps, Chairman Sec.....		2.50
24.	" " Thos. McDavitt, additional on registers...		66.80
July 10.	" " Freight on Registers, Duluth and return....		2.00
12	" " C. H. Hunter, censor of papers.....		25.00
23.	" " Postage and mailing registers.....		24.00
17.	" " F. A. Blackmer, censor of papers.....		25.00
Aug. 5.	" " A. G. Long, Stenographer.....		15.00
16.	" " A. G. Long, Stenographer.....		15.00
Dec. 18.	" " W. L. Klein, postage transactions.....		45.00
18.	" " N. W. Lancet, publishing transactions.....		271.75
1896.			
Feb. 17.	" " Gt. Western Printing Co., receipts, Treas..		2.50
18.	" " Tribune Job Print. Co., Envelopes.....		12.25
19.	" " Tribune Job Print. Co., notices of dues		2.75
March 3.	" " E. D. Smith & Co., stationery for Secretary.		4.75
9.	" " A. G. Long, additional reporting		1.85
June 8.	" " H. E. Holmes, censor of papers 1896. ...		25.00
8.	" " S. M. Stocker, censor of papers 1896.....		25.00
9.	" " J. W. Bell, censor of papers 1896		25.00
1.	" " I. Donnelly, Jr., salary Secretary, 1896.....		100.00
1.	" " R. J. Hill, Treasurer's salary 1896.....		100.00
Total disbursements....			$ 913 90
Balance on hand June 17, 1896.....			439.06
			$1,352.96

Dr. McDAVITT: I move the report of the Treasurer be received, approved and accepted.

The motion being seconded and put to a vote prevailed.

Dr. McDAVITT: In connection with the Treasurer's report, I wish to make a report of the publishing of the Register.

Paid to the Pioneer Press Co. for publishing Register..		$216.80
For compilation and clerical work.....		275.00
Total disbursements.		$491.80
Receipts from advertisements.....	$125.00	
Received from Treasurer State Medical Society.....	366.80	
Total receipts.....		$491.80

Pres. ALLPORT: You have heard the report of Dr. McDAVITT; what will you do with it?

Dr. MAGIE: I move the report be received, approved and placed on file.

The motion receiving a second, and being voted upon, prevailed.

Dr. ANDREWS: In the report of the Executive Committee two things were passed over, which, it seems to me, require attention. One was the invitation of the Mississippi Valley Medical Association to attend its meetings in St. Paul. I move this invitation be accepted, and that the Secretary return the thanks of this Society for the invitation.

The motion was seconded, and being voted on, unanimously prevailed.

Dr. ANDREWS: I move that the invitation of the Hennepin County Medical Society to the State Medical Society to attend the "Smoke Social" on Friday evening be accepted.

The motion was seconded, and on vote prevailed unanimously.

President FRANK ALLPORT, M. D., of Minneapolis, then delivered the annual address.

Dr. HALL: I move that a vote of thanks be extended to the President for his able and instructive address.

The motion was seconded, and being put to a vote of the house by the Secretary, unanimously prevailed.

Dr. BEARD: I move you that a committee of three be appointed by the Chair, to whom the address of the President shall be referred, and who shall report on the recommendations contained in the paper tomorrow.

The motion being seconded and voted upon, unanimously prevailed.

Pres. ALLPORT: The next order of business is miscellaneous business. The official stenographer of the meeting has requested me to ask the ladies and gentlemen partaking in the discussions from time to time, to mention their names as they rise, in order that there be no confusion of the notes. Is there any miscellaneous business?

Dr. HALL: Mr. Chairman, there is another matter in line with your address which I wish to present to the meeting at this time. It is a matter which interests the medical profession, without

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doubt, and without further remark I shall read the resolution which I have prepared, after which I shall move its adoption.

Dr. HALL then presented the following resolutions to the Society:

WHEREAS, The present method of obtaining medical expert testimony tends to the prostitution of medical knowledge, and thus brings the medical profession into disrepute; and

WHEREAS, The medical profession cannot shift the responsibility for the widespread opinion held by the laity, that medical testimony can always be obtained on any side of any case for a money consideration, which opinion is shared largely by the legal profession, who express themselves freely as to the utter worthlessness of such testimony; and

WHEREAS, The medical profession, by longer keeping silent upon this question, will justly merit the condemnation under which it rests, therefore be it

Resolved, That the Minnesota State Medical Society would recommend the enactment of a law by the legislature providing for the appointment of experts by the courts, and that only physicians of repute in the particular branch of medical science to which the question calling for expert opinion relates shall be appointed; that the function of the experts so appointed shall be such as to adequately represent the court and both sides of the question at issue, as in the judgment of the court shall seem necessary; that the experts so appointed shall have full and free access to all the evidence in the case, as well as access to the plaintiff or defendant in person, as the case may be, if the issue involves his mental or physical state; that the experts shall submit to the court for transmission to the jury a report in writing setting forth their conclusion and the facts in evidence upon which such conclusion is based; that the cross-examination of such experts shall be limited to the facts and opinions embraced in their testimony as embodied in their report, and that their compensation shall be fixed by the courts at a rate that is reasonable for professional services of such a nature.

Dr. HALL: I move the adoption of these resolutions.

The motion was seconded by Dr. BEARD and others.

Pres. ALLPORT: You have heard the resolutions read by Dr. HALL, who has moved their adoption; the motion has been seconded. Are there any remarks?

Dr. MCDAVITT: I move you, before the adoption of those resolutions, they be turned over to a committee of three to report tomorrow. I would suggest the same committee appointed to consider the President's address. I think it is a matter of too much importance to immediately adopt the resolutions, without first fully considering them. I would offer that as an amendment to Dr. HALL'S motion.

Pres. ALLPORT: Gentlemen, you have heard Dr. MCDAVITT'S amendment to Dr. HALL'S motion, that the same committee of three who are to report upon the President's address shall take into consideration the matter submitted by Dr. HALL. Are you ready to vote on the amendment?

Dr. COCKBURN: As the object of the amendment is to prevent hasty action, why would it not be better to appoint a separate committee, as the committee on the President's address will have too much to do. I will offer that as an amendment to Dr. MCDAVITT'S amendment.

Pres. ALLPORT: You have heard the amendment to the amendment that a separate committee be appointed to consider Dr. HALL'S resolutions. What is your pleasure in the matter?

Dr. JONES: It seems to me that one committee can deal with all those questions. If we are going to multiply the committees it will hinder our program. I think one committee can do the work.

Dr. ANDREWS: I agree with Dr. JONES, and yet I can see no objection to the amendment to the amendment; there are certainly six men in this body qualified to consider these resolutions.

Dr. HALL: I would say that I think that all these questions can be submitted to the same committee. If we multiply committees it will only confuse the order of business.

Dr. COCKBURN: As Dr. HALL has offered these resolutions I will withdraw my motion, the amendment to the amendment.

Pres. ALLPORT: That leaves before us Dr. MCDAVITT'S amendment to Dr. HALL'S motion, that the same committee be appointed to review both matters. Any remarks? Are you ready for the amendment?

The motion to amend being put to a vote prevailed.

Pres. ALLPORT: Dr. HALL, does that cover your motion, also?

Dr. HALL: I think that covers it.

Pres. ALLPORT: Dr. BEARD suggests that I put the motion as amended.

Dr. HALL: It is really a motion to refer.

Dr. ANDREWS: Dr. HALL'S motion was to adopt the resolutions.

The motion as amended being put to a vote unanimously prevailed.

Dr. BEARD: I would like to inquire if Dr. JACKSON is present. Dr. JACKSON is chairman of the Committee on New Members, and it is very desirable that that committee get down to business as soon as possible. There are some applications now to be passed upon. In Dr. JACKSON'S absence I move that Dr. ANDREWS be appointed chairman of that committee, *pro tem.*

The motion was seconded and prevailed.

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Pres. ALLPORT: Dr. HILL requests me to ask all members to register. Dr. MCDAVITT, of St. Paul, requests me to call attention to the fact that the Hon. Pierce Butler, of St. Paul, will this evening address the Section of Medical Jurisprudence on the subject of "The Medical Expert," and he requests that a full attendance be present, as he considers Mr. Butler a competent authority on this subject.

Dr. MCDAVITT. Mr. Butler is county attorney of Ramsey County, and he will handle the subject from the lawyer's standpoint.

Sec'y DONNELLY: I have here several communications which I desire to read.

Dr. DONNELLY then read the following communication from Dr. Sternberg, Surgeon-General of the U. S. Army:

I. DONNELLY, M. D., Secretary Minnesota State Medical Society, St. Paul, Minn.

MY DEAR DOCTOR:—I beg leave to call your attention to copies of a pamphlet containing the resolutions of various medical and scientific societies in opposition to the bill which has been introduced in Congress for the restriction of animal experimentation in the District of Columbia, which I send you in a separate enclosure.

It is important that the medical profession in all parts of the country should be heard from in opposition to this bill, which is intended as an entering wedge by the anti-vivisectionists. If they are successful here they will, no doubt, seek similar legislation in the different states. Permit me to suggest that you bring this matter to the attention of your State Medical Society, at its coming meeting, and that resolutions be submitted embodying the views expressed in the resolutions of the American Medical Asociation. It would be well for your most influential members to communicate directly with their Representatives in Congress, protesting against this legislation. If resolutions are adopted by your Society they could be sent to one of your Senators, who would, without doubt, introduce them and have them referred to the proper committee. Very truly yours,

GEO. M. STERNBERG,
Surgeon-Gen. U. S. A.

Sec'y DONNELLY: Now I would like to read the resolutions adopted by the American Medical Association on the same subject.

Tthe following resolutions were adopted by the American Medical Association, May 6, 1896:

WHEREAS, The members of the American Medical Association recognize the fact that the development of scientific medicine has resulted largely from experiments upon the lower animals; and

WHEREAS, Anæsthetics are habitually administered to animals subjected to painful experiments; and

WHEREAS, Restrictive legislation is, in our opinion, unnecessary and opposed to the continued progress of medical science; and

WHEREAS, It is an unjust reflection upon the humanity of those engaged in animal experimentation to enact laws requiring them to use anæsthetics and appointing inspectors to see that they do so; and

WHEREAS, Far more unnecessary pain is constantly being inflicted upon the lower animals for sport and gain than in biological and pathological laboratories; and

WHEREAS, No evidence has been presented by those who advocate restrictive legislation showing that abuses exist in the District of Columbia; and

WHEREAS, Results of great practical importance have been obtained by experiments on the lower animals made in the government laboratories in the District of Columbia:

Therefore be it resolved, That the American Association earnestly protests against the passage of Senate bill No. 1552, entitled "A bill for the further prevention of cruelty to animals in the District of Columbia," or any modification of this bill, unless it shall first be shown by an impartial investigation that cruel and unnecessary experiments are being performed in the District of Columbia, and that existing laws do not provide suitable punishment for cruelty to the domestic animals.

Resolved, That copies of these resolutions, attested by the signatures of the President of the American Medical Association and of its committee appointed to draft these resolutions, be sent to the chairmen of the committees on the District of Columbia of the House of Representatives and Senate of the United States.

(Signed)
BEVERLY COLE, M. D. (San Francisco),
President American Medical Association.
NICHOLAS SENN, M. D. (Chicago),
President-elect American Medical Association.
WM. OSLER, M. D. (Baltimore).
J. MCFADDEN GASTON, M. D. (Atlanta).
GEO. M. GOULD, M. D. (Philadelphia).
DONALD MCLEAN, M. D. (Detroit).

Dr. HILL: I move this matter be referred to the same committee already provided for to report tomorrow.

Dr. HUNTER: I would suggest that the committee be instructed to bring in a resolution of protest against the passage of the law, and that such resolutions be referred or forwarded to the proper authorities. I would offer that as an amendment.

Dr. HILL: I accept that amendment.

Pres. ALLPORT: You have heard the motion of Dr. HILL, that the matter referred to be referred to the same committee of three, with instructions to bring in a protest against the passage of such a

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law, and to communicate the protest to the proper authorities.

The motion being put to a vote unanimously prevailed.

Sec'y DONNELLY: I have here a communication from the Michigan State Society, which I will read:

GRAND RAPIDS, MICH., January 28, 1896.

DEAR DOCTOR:—At the last meeting of the Michigan State Medical Society, a committee (of which I am secretary) was appointed to consider means relative to promoting more complete or systematic organization of the medical profession throughout the country.

In accordance with the request of the Committee I ask you to read carefully the enclosed address, and to present the subject, by means of the synopsis, to your State Society.

Our committee earnestly desires that some concert of action may be had in the matter, and to that end takes the liberty of urging you to use all proper means to have a committee appointed whose duty it shall be to confer, by letter or in person, with similar committees from the other state societies for the purpose of formulating some plan that may be presented for adoption by the state societies next year. Please let me hear from you at your earliest convenience.

Very respectfully,

R. J. KIRKLAND.

Dr. ANDREWS: I move this matter be referred to the committee on recommendations.

The motion was seconded by Dr. HUNTER and others.

Dr. HILL: I think we have reached a point now where another committee might well be appointed. The matters already ordered referred to a previous committee are matters for state and national legislation. These other matters are some that concern societies only, and can be regulated by them, and I believe it would be better to have another committee.

Dr. STINCHFIELD: I rise to move a new committee. This matter just presented to us is very broad in its scope and requires careful consideration, and we would not be able to consider it as we should at this session, and I move a reference to a special committee. I wish to amend the motion already made by moving that a special committee be appointed to whom this matter be referred.

Dr. ANDREWS: I accept the amendment.

Dr. FLINN: This resolution, I think, had better be referred to a separate committee, as it is an important question; it is really trying to establish another organization.

Dr. DONNELLY: I think it is the same thing, only it is a connecting link between the National Society and state and county societies.

Dr. HUNTER: Is Dr. DONNELLY able to inform us what is the real significance of this matter?

Dr. DONNELLY: I cannot say. I know nothing more than what is contained in the communication I have read to the Society.

Dr. HUNTER: I think many of us would be glad to be informed of the personnel of such a society.

Dr. MCDAVITT: I think that is the object of the committee to be appointed, to find out and let us know tomorrow.

Pres. ALLPORT: Dr. ANDREWS has withdrawn his motion, and we are acting on Dr. STINCHFIELD'S motion.

Dr. STINCHFIELD: I wish to add a word in this matter. This is very broad in its scope, and the movement may strike deeper than would appear on the surface. I think we ought to know all the facts in the case, and what is the real animus of the movement.

Pres. ALLPORT: As Dr. HILL suggests, this is a matter that will be investigated by the committee. Dr. STINCHFIELD'S motion is that a separate committee be appointed to take charge of this matter.

The motion being put to a vote unanimously prevailed.

Pres. ALLPORT: I will appoint as members of that committee Dr. ANDREWS, of Mankato, Dr. FLINN, of Redwood Falls, and Dr. STEWART, of Minneapolis. I will also appoint the other committee on the President's address: Dr. BEARD and Dr. HALL, of Minneapolis, and Dr. STINCHFIELD, of Rochester.

Dr. ANDREWS: Under the head of miscellaneous business I would like to bring before the Society a certain matter at this time. I am sorry my friend Davis is not here to help me. The State Society has grown to such proportions that it is a matter of considerable burden upon the local society, outside of Minneapolis, St. Paul and Duluth, to entertain this Society. It is a time-honored custom that this Society shall close with a banquet. We are from Mankato, where we would like to have the State Society meet with us. We have ample accommodations in every way, except that it is too much of a burden to banquet the Society, and it has occurred to me, and I think I speak the sentiment of the Society, that if the matter of a banquet is not entirely dispensed with, it should be placed so it will not be a burden on any local society, and I am going to make a motion to cover the ground, so that hereafter no place where the meetings of the Society may be held will be embarrassed. I therefore move that it be the sense of this Society that hereafter no banquet be given to the State Society at the expense of the local society.

The motion was seconded by Dr. FLINN and others.

Pres. ALLPORT: Gentlemen, Dr. ANDREWS moves that hereafter no banquet or other entertaiment be

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given at the expense of the local society where the meeting of the State Society is held.

Dr. BROWN: I am very glad to second that motion. I felt for a good while that we were occupying rather a provincial position in Minneapolis and St. Paul in carrying out the program that has been carried out for many years. The reason of Dr. ANDREWS for abandoning the custom is a very good one, for none of the societies, except the societies of the two cities, can entertain any such body without being altogether too much burdened. The reason why the custom was retained in those cities it is not necessary to say anything about. I think now is a very good time to get out of this rut, and I am glad to second Dr. ANDREWS' motion.

Pres. ALLPORT: The motion is now open for discussion. Has anyone any further remarks to make?

Dr. BEARD: I would move an amendment to that motion, that the question of entertainment be hereafter referred to the Executive Committee of the Society, if that committee deem best, to arrange for its own entertainment.

The motion was seconded by Dr. HILL.

Pres. ALLPORT: Dr. BEARD moves an amendment that hereafter the entertainment of the Society be placed in the hands of the Executive Committee, and that such committee use its own discretion with regard to entertainment and cost thereof, and that if it deem best to arrange for such, that the Society be its own entertainer.

Dr. JONES: This is a matter of some importance, and rather an embarrassing one to come from Hennepin County, for it has been the custom when several societies met together, to have some sort of "blowout," but it was found more favorable and agreable to have the entertainment an individual affair, where, if a man wanted to attend a banquet or entertainment, he would have to do it at his own expense. It seemed to me at first it was rather a selfish arrangement, but the more I attended the more satisfaction I got out of it. I found I was not embarrassing anyone.

Dr. BEARD: I wish to explain that I did not intend that the Treasurer of the Society should pay for the entertainment, but that the members should pay for the entertainment, that we should adopt the plan suggested by Dr. JONES. The cost should be borne by the members.

Dr. ANDREWS: I simply rise again to say that I hope this will carry for more reasons than one, and one is that there are physicians scattered throughout the country who do not come in until towards the evening of the third day, and then they come to get full of champagne, and it would be a good idea to cut them off. (Laughter).

Dr. WALLING: I come from the country, and I always come the first day, or rather the night before. I am sorry I was not a member long before I did join. The first meeting in St. Paul I enjoyed so much I made up my mind I would not miss another banquet. (Laughter). At the next meeting, in Duluth, they took us out for a boat ride, and I made up my mind if the meeting was held where there was any water, and a chance to take a boat ride, I would not miss it. At the same time, I am in favor of this motion, for I have never traveled much in the southern part of the state; I have never been at Mankato, but I want to go down there, but I do not want to embarrass the physicians there. I would like to have the Society come to our place, but we would feel rather embarrassed if we should have to give an entertain ment. (Laughter). There are only four physicians in the county, and therefore I believe I am in favor of the resolution. I am sorry to admit there are some who go to the banquet only for the champagne. (Laughter).

Dr. ANDREWS: I will withdraw my motion with the consent of the second.

The motion of Dr. BEARD, that the matter of entertainment be left in the hands of the executive committee, being put to a vote, unanimously prevailed.

Dr. BEARD: We have with us as a guest of the Minnesota State Medical Society, a gentleman whom I am sure we shall all be glad to welcome, Dr. FRANK S. JOHNSON, of Chicago, and I want to move you that he be welcomed to the Society and invited to the privileges of the floor.

The motion was seconded by a number of gentlemen, and the privileges embodied in Dr. BEARD'S motion were unanimously, and by a rising vote, extended to Dr. JOHNSON.

Pres. ALLPORT: Dr. JOHNSON, we cordially welcome you to the Society and extend to you the privileges of the floor. Perhaps you may wish to use that privilege now.

Dr. JOHNSON: I thank you very heartily, gentlemen, for the courtesy you have extended to me. (Applause).

Sec'y DONNELLY: I have some telegrams here I wish to read. One from the State Pharmaceutical Association, now in session at Lake Minnetonka:

Secretary State Medical Association, West Hotel.

Resolved, That this Association extend to the State Medical Association, now in session at the West Hotel, Minneapolis, an invitation to enjoy with us the boat ride this afternoon, and that they be our guests at the address of Prof. Prescott this evening, and that this information be transmitted via telegram by our secretary with the official seal of this Association.

WM. GATSEWITZ, Prest.

Dr. JONES: I move that the Secretary be instructed to send a telegram to the effect that the

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invitation is received with thanks, but that on account of press of business we cannot accept it.

The motion was seconded, and being put to a vote prevailed.

On motion of Dr. ANDREWS the Society adjourned to Wednesday morning.

WEDNESDAY, JUNE 18, 1896.

The Society assembled at 10:30 o'clock and was called to order by President ALLPORT.

Pres. ALLPORT: The meeting will please come to order. The first thing on the order of business is the transaction of miscellaneous business. Is there any miscellaneous business to come before the meeting?

Sec'y DONNELLY: I have a communication here from W. S. Rowley, Corresponding Secretary of the World's Congress of Medical Climatology.

Chas. B. Witherle, M. D., Secretary Minnesota State Medical Society, St. Paul, Minn.

DEAR DOCTOR:—As the time is now drawing near when the various State Medical Societies hold their annual meetings, I take this opportunity of calling your attention to the importance of such societies naming delegates to attend our meetings.

Under our constitution each State Medical Society is empowered to appoint ten representatives, who thereby become eligible to membership in our Congress, and to represent their own state in this body. The subject of Climatology is of the greatest importance to the medical profession, and it is our desire to have the coöperation of every state society in making a careful, systematic and scientific classification of the climates, health resorts and mineral waters of the United States, so that the profession may have reliable data on this most important subject.

Every state should take a local pride in making known the climatic advantages, health resorts and mineral waters within its own boundaries. All representatives thus appointed will have equal rights as members, and our work when completed will be just what its members severally and collectively have helped to make it.

Delegates were appointed from nearly all the state medical societies last year by the secretaries of the same, and in such cases we wish to have them confirmed at your next annual meeting, and when any have been appointed who cannot serve it is our desire to have others named in their places.

Our meeting will probably be held in New Orleans in November, 1896, and a large attendance is confidently expected. Will you bring this matter before your members at your next meeting, and apprise us of the result at the earliest possible date so that we may write each delegate personally? Address, No. 520 Hennen Building, New Orleans, La. Thanking you in advance for all courtesies, I am, very respectfully yours,

W. S. ROWLEY, Cor. Sec'y.

Pres. ALLPORT: You have here a communication addressed to the Secretary of the Society, what will you do with it?

Dr. BELL: I had the misfortune last winter to be in the South, as you know, and I attended a meeting of this body at San Antonio, Texas. I have grave doubts whether it is an organization of very great merit. I question the propriety of this meeting taking any special notice of that communication. For that reason I would move that it be accepted, placed on file and laid on the table.

The motion was seconded by Dr. MOORE, and being voted upon, unanimously prevailed.

Pres. ALLPORT: Any further miscellaneous business?

Dr. BEARD read a communication from Dr. Billings, of Chicago.

Pres. ALLPORT: You have heard the communication from Dr. Billings, of Chicago, what will you do with it?

Dr. ANDREWS: I move that the Secretary be instructed to acknowledge receipt of the letter and express the regrets of this Society at his absence.

Pres. ALLPORT: I would suggest that inasmuch as Dr. BEARD received the communication he attend to that.

The question being put to a vote prevailed.

Pres. ALLPORT: Any further miscellaneous business?

Dr. BEARD: I have a communication from Dr. W. A. CHAMBERLAIN, of St. Charles, who is Chairman of the Section of Obstetrics and Diseases of Children, asking that Dr. RANSON be appointed chairman of the section in his place.

Dr. BELL: I move that Dr. CHAMBERLAIN'S wishes in this matter be carried out.

The motion was seconded, and on vote prevailed.

Pres. ALLPORT: Any further miscellaneous business?

Dr. BEARD: I want to call the attention of the Society to the matter of rates. The Soo Line has authorized a rate of one and one-third in Minnesota, but there must be one hundred in attendance at the meeting coming over the railroads, and it will be necessary to show them to the Secretary in order to get them signed.

Dr. HILL: I want to state to the members of the Society that it is necessary for each member to sign the register, as that is all we have to show for their presence at the meeting. The roll call has been dispensed with, and it is the only record we have to show the number in attendance. Those who have not already done so will please sign the register.

Sec'y DONNELLY: I would like to make another statement. Quite a number of new members have joined the Society, but very few of them have signed the constitution. According to the constitution the gentlemen are not donsidered members

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until they have signed it, so I would request that they come forward at some time during the meeting and sign it.

Dr. BEARD: I want to say that Dr. ANDREWS will receive any names for membership to be considered by this committee.

Pres. ALLPORT: Any further miscellaneous business?

Dr. BEARD: I want to call the attention of the Society to the fact that we have with us as a guest of the Society this morning Dr. E. C. Dudley, of Chicago. I want to move that he be welcomed to the Society, and accorded the privileges of the floor.

Pres. ALLPORT: I will call for a standing vote on this motion.

The motion of Dr. BEARD was adopted by a rising vote.

Pres. ALLPORT: Dr. DUDLEY, the Society unanimously welcomes you to its midst, and accords you the privileges of the floor during the session.

Dr. BEARD: The Executive Committee wishes to call attention to some of the announcements made yesterday to those who may not have been present on that occasion. There is an invitation accepted from the State University to the State Society for a visit to the University this morning at 11:30, immediately following this session. The special cars which have been engaged to convey the members to the University will be on the tracks at that hour. It is desirable we take those cars as promptly as possible, as they can be detained but a few minutes on the track on account of the active passing of cars on those lines. The committee is very anxious that the members of the Society should all be present in response to this invitation. We want you all to take the cars with us and make this trip. The President of the University has undertaken to be present to meet us this morning and will address us, and it is expected that ex-Governor Pillsbury and Hon. C. K. Davis will be present, and will have something to say to the members. After we have met the officials of the University in the Library Building we shall proceed to inspect the buildings, and a lunch will be served to the members. The cars will be on the track for the return of the members to the Society at 20 minutes of 2 so we may return in time for the afternoon session.

The Hennepin County Medical Society also wishes to extend an invitation to the Society to a smoke social, which is to be given tomorrow evening in the large dining room of the hotel. The invitations for this entertainment will be handed out at the afternoon session today. Any member can obtain these invitations from Dr. JONES or from myself.

Pres. ALLPORT: Any further miscellaneous business?

Dr. BEARD: I cannot state whether the cars will be immediately in front of the hotel or around the corner on Sixth street.

Pres. ALLPORT: Any further miscellaneous business? If not, we will go on to the next order, reports of correspondents. Any correspondence to be reported? If not, we will go on to the reports of delegates. Any delegates to report? If not, we will go on to the next order, the report of standing and special committees. Any standing committees to report this morning?

Sec'y DONNELLY: There is a committee, Mr. President, composed of Dr. BEARD, Dr. HALL and Dr. STINCHFIELD to report. Dr. BEARD is chairman of that committee.

Dr. BEARD. Mr. President, and Members of the Society: The committee appointed yesterday, to whom was referred the address of the President, has considered the suggestions made by the President in his valuable address, and to this same committee were referred the resolutions submitted by Dr. HALL in reference to medical testimony. To this committee was also referred a question of legislation in regard to vivisection. It was represented to the Society that a bill was introduced in the United States Congress by the anti-vivisectionists looking to the abolishment of vivisection in the District of Columbia. The committee finds that this is simply a step in advance of a movement looking to similar legislation in other states of the Union. There are several bills in press, or in process of preparation, which are to be presented to the several states during their several coming legislative sessions. On this subject the committee wishes to offer the following resolutions:

WHEREAS, Questions of legislative policy frequently arise which the medical profession should consider, and in the shaping of which it should take an active part; and

WHEREAS, Reforms, in particular, are required in the coroner laws and in the conduct of medical expert testimony in the courts, which should be the subject of careful and early consideration by the profession, therefore

Resolved, That the suggestions offered by the President, in his annual address, with reference to the office of coroner, and the resolutions offered by Dr. W. A. HALL regarding medical expert testimony be, and are hereby, adopted as the sense of this Society.

Resolved, That a special committee, to be known as the "Committee upon Medical Legislation," be created, and that it consist of a chairman, a secretary and of twenty-three other members, chosen from the different sections of the State, and to be appointed by the President once in two years That vacancies in this committee, occurring by death or removal, shall be filled by vote of the remaining members, pending the next biennial appointment.

Resolved, That successfully to effectuate the work of this committee, the sum of one hundred.

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and fifty dollars ($150) be appropriated by the Society in each legislative year, to be expended, as the committee shall direct, for postage, typewriting, printing, etc., in the furtherance of the objects of its creation.

Resolved, That all questions bearing upon medical legislation be referred to this committee for consideration, action and report to the Society; that it be its duty to frame bills and influence their passage in the legislature, subject to the wishes of the Society; and to influence and educate the public along these lines.

Dr. BEARD: There has been in the past a committee on legislation; it has had no special reference to medical legislation. During the last two years that committee has been appointed, although it is not provided for in the constitution. For some reason, when the constitution was revised three or four years ago, this committee was dropped, and therefore we have no committee which is properly constituted under our rules. Your committee deems it very desirable that a very large, active and influential committee be appointed for this purpose. We should like to have you deal with those resolutions first before I present those on vivisection.

Pres. ALLPORT: You have heard the resolutions as read by Dr. BEARD, what will you do with them?

Dr. GROVES: I move they be adopted.

The motion was seconded, and a vote being taken, prevailed.

Sec'y DONNELLY: The committee appointed have also another resolution to report upon.

Dr. BEARD: That is included in this report. We have now the report of the Committee on Vivisection. The committee wishes to present the following preamble and resolutions:

WHEREAS, Science, within recent years, has received untold benefits and has made phenominal progress from the legitimate practice of vivisection; and

WHEREAS, Humanity has profited, and is destined to profit, immeasurably by the discoveries in physiology, pathology and bacteriology which have been made possible by the scientific use of living animals; and

WHEREAS, Certain organizations, self-styled anti-vivisectionists, inspired by motives more sentimental than sound—with minds moved by emotional influences and hysterical arguments rather than by scientific facts—are seeking to strike a blow at the interests of science by the introduction into the Congress of the United States of a bill restricting or abolishing vivisection in the District of Columbia; and

WHEREAS, The introduction of this measure is but a step preparatory to the presentation of other and similar measures in our state legislatures, therefore be it

Resolved, That this Society denounces such attempted legislation as mischievous to the medical profession, as suicidal to the interests of society, as destructive to science, and as perversive of those moral standards which maintain a true relationship of things.

Resolved, That this Society petitions the Senators and Representatives of this State in Congress to use their utmost efforts for the defeat of this obnoxious measure.

Pres. ALLPORT: You have heard the report of the committee; what will you do with it?

Dr. ROBINSON: I move the report be accepted as read and adopted.

Pres. ALLPORT: Any remarks?

A vote being taken, the report of the committee was unanimously adopted.

Pres. ALLPORT: Any other committees to report?

Dr. WALLING: The committee to investigate antitoxin has a report to make.

Pres. ALLPORT: Are you prepared to report?

Dr. WALLING: Yes, sir; I am prepared to report.

To the Officers and Members of the Minnesota State Medical Society.

FELLOW DOCTORS:—We, your committee appointed to investigate the use of antitoxin in comparison with other treatments as used in the state, beg leave to submit the following report:

The plan adopted was to send a circular to each physician in the state, asking him to report for the benefit of humanity, all cases of diphtheria that have been under his care. Accompanying this was a blank sufficient to report twelve cases, and when properly filled represented either the antitoxin treatment or any other that had been used. There was an evident misunderstanding by many who had not used antitoxin, and many cases otherwise treated were not reported. We think, however, enough were reported upon which to base a fair comparison, and we take this opportunity to thank the doctors throughout the state who have so promptly responded.

The whole number of cases reported, including all treatments, were 643. Of these 104 died, a mortality of 16.17 per cent. The whole number of cases treated by antitoxin alone was 405. Of these 49 died, a mortality of 12.09 per cent.

The total number reported as treated by antitoxin in conjunction with other treatments was 95. Of these 12 died, a mortality of 12.63 per cent. The whole number treated without antitoxin was 150. Of these 40 died, a mortality of 26⅔ per cent. The mortality according to age was as follows, the age not being reported in all cases:

By antitoxin there were treated under two years 29 cases; deaths, 11; per centage, 37.93.

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	Cases.	Deaths.	Percentage.
From 2 to 3 years....	41	9	21.95
" 3 " 5 "	85	14	16.47
" 5 " 10 "	170	42	24.70
" 10 " 15 "	71	6	8.45
Over 15 years.....	88	2	2.27

By other treatments there were treated under 2 years, 2 cases; deaths, 2; percentage, 100.

	Cases.	Deaths.	Percentage.
From 2 to 3 years.....	8	3	37.50
" 3 " 5 "	22	7	31.81
" 5 " 10 "	42	7	16.66
" 10 " 15 "	21	5	23.81
Over 15 years.....	25	3	12.00

Out of 52 cases in which the sex was reported, there was a mortality of 14 males and 12 females where antitoxin was used, and 6 males and 20 females where other treatment was used. Out of 399 cases where antitoxin was used bacteriological examinations were made in 119 cases, and in 70 out of 76 cases Klebs-Loeffler bacilli were reported present, the result not being reported in other cases. In 122 cases, where other treatment was used, bacteriological examination was made in 22 cases, with what result is not stated, except they were reported as cases of diphtheria, and it is fair to suppose the diagnoses in cases examined were based on the examinations.

Paralysis was reported as following in cases where antitoxin was used in 30 cases out of 133 reported; where other treatments were used in 16 out of 96 cases reported:

Of the laryngeal cases that were treated by antitoxin there were 31 cases reported and 12 of the deaths occurred in these cases. In other treatments there were 50 laryngeal cases reported, and 26 of the deaths were reported in the same cases. Post nasal involvement was reported in 98 cases, 52 under antitoxin treatment, with 13 deaths, and 46 under other treatment, with 14 deaths. Most cases treated by antitoxin were also treated locally by gargles or antiseptic washes. Perchloride of iron and peroxide of hydrogen, chlorate of potash and Loeffler's solution being often mentioned. Intubation was practised in a few cases, and was generally successful when the patient had sufficient vitality. The amount of antitoxin used varied from five to thirty cubic centimeters. All of which is respectfully submitted.

P. A. WALLING, M. D.
C. G. WESTON, M. D.

Pres. ALLPORT: You have heard the report of Dr. WALLING; what will you do with it?

Dr. GROVES: I move the report be accepted and placed on file.

The motion was seconded, and a vote being taken, prevailed.

Pres. ALLPORT: Any other committees to report?

Dr. BROWN: I would like to inquire if the work of this committee is not to be continued? I think it would be well to continue the committee another year. I move you that the committee be continued another year.

The motion was seconded and adopted.

Pres. ALLPORT: Any other committees to report?

Sec'y DONNELLY: The committee consisting of Dr. ANDREWS, Dr. FLYNN and Dr. STEWART is to report.

Dr. ANDREWS: I ought to say right here that while the committee met yesterday to consider these communications and decided on what is embodied in this report, I have been entirely unable to find any members of this committee to submit this report to them. I think it embodies only what we have decided upon yesterday, and you will observe that the report is an adverse one.

To the President and Members of the Minnesota State Medical Society.

GENTLEMEN:—Your special committee to whom was referred the communication from the Michigan State Medical Society, together with the accompanying address, respectfully submit the following:

We recommend that this Society take no action on said address for the following reasons:

First. It is one in which the American Medical Association is vitally interested, and said address does not originate from said American Medical Association, but from a state society, and there is no evidence in the address that the American Medical Association has been consulted.

Second. It contemplates that any person joining a county or other local society shall pay a fee of $10, $5 of which shall go to the American Medical Association, $3 to the state association and $2 to the local society, and this alone constitutes him a member of all those societies, hence making the local societies the dictators as to who shall be members of the state and national societies, taking away from the state and national societies the right to elect or reject members seeking admission into such bodies.

Third. By article 6 it contemplates that a degree known as "Fellow of the American Medical Association" shall be created by said American Medical Association, and that every member of every county or other local society shall, by virtue of this membership, be entitled to the degree of "Fellow of the American Medical Association."

Fourth. It further contemplates that the American Medical Association shall exercise jurisdiction over the state societies, and the state societies over their respective county or other local societies.

[Signed] J. W. ANDREWS.
W. D. FLINN.

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Dr. HALL: I move the report be accepted and adopted.

The motion was seconded by Dr. GROVES.

Pres. ALLPORT: Any remarks?

Dr. BROWN: I am sorry the committee has found it necessary to give us such a report. While I have no information on the subject other than all of us have, I must say that I have for a little time felt a good deal of interest in this association, in this organization of state and local societies, and it seems to me we make a mistake if we take quite such summary measures as the committee seems disposed to take in disposing of this communication from the Michigan State Society. For years, since I have known anything about medical societies, I have had a feeling that there ought to be a closer union between national, state and local societies. I know of a union in one state, Indiana, about which probably you know more than I do, in which members of the state society are members of the local and county societies, and it seems to me it would be very desirable if this arrangement could be extended so that membership in the national society could depend upon membership in the state and county societies. We all know that the merits of members of the national society have very little weight as regards their local connection. Of course, a person wishing to become a member of the national society, to be elected, must present a certificate from his local society, but it seems to me that is not a satisfactory method, and it would be very desirable if this plan of organization could be carried out with such changes as might be advisable. Everyone knows it is possible for men who might not be able to secure admission to local societies to become members of our state societies, at least in this state, and possibly occupy very prominent positions, and I think such possibilities should be limited, and I think this state might at least act in harmony with the Michigan Society in pushing in this entering wedge.

Dr. HALL: I wish to explain briefly the reason why the committee adopted this report. It was solely upon the first statement made in this report, that it did not appear that this movement came from the American Medical Association. If this movement was inaugurated by the American Medcal Association itself I would be in favor of its adoption; otherwise not.

Pres. ALLPORT: Any further remarks?

Dr. ANDREWS: I wish to say again, as we have said in the report, that the objectionable features are these: First, anyone who becomes a member of a local or county society must pay the full fee at that time to the National Society, the American Medical Association, and to his State Society, making a total fee of $10, presuming that the fee of the local society is $2. That means that a half dozen physicians in some counties may organize a county medical society and they are all members of the State Society, and they are all members of the National Society, and, if the spirit of these recommendations is carried, that a degree of "Fellow of American Medical Association" is granted, then they also are Fellows of the American Medical Association. I believe with Dr. BROWN that some such arrangement would be wise if a recommendation must come from the county to the state society before a man could be admitted to either the state society or the national society, but this idea of making county societies sole arbiters of membership seems unfair to the committee.

A vote being taken the report of the committee was adopted.

Pres. ALLPORT: Any other committees to report?

Dr. ANDREWS: The report of the committee on new members. I wish to state in connection with this report that the committee on new members has sought to adhere to this clause in our constitution, Article IV.:

"All candidates for active or honorary membership residing in any county or state where a county medical society exists, shall present a certificate from the secretary of said county society that they are members in good standing."

I say the committee has sought to make its report in accordance with this portion of Article IV., but we have found it almost impossible to do so at this time. We have therefore taken the liberty to make a personal canvass of the names handed us to ascertain whether they were worthy or not. Although this is embodied in the printed report, the committee wishes to make this recommendation, that hereafter any candidate for admission in the Minnesota State Medical Society shall not be eligible unless he brings with him a certificate properly signed showing that he is a member of his local society, provided there is a local society in the county where he lives; if such a society does not exist, that he come with a certificate signed by two members of the medical society living in the portion of the state where he resides. We deemed it wise to offer this recommendation, because names have been presented to us about which we know nothing, and in some cases the college has not been mentioned, and as it is at present it is very possible for some unworthy man to get in. I am informed that a homœopathist was recently admitted to a local society. This ought to be remedied. (Dr. ANDREWS then read the names of candidates for membership, which will be found printed in italics in the roster at the end of the volume of transactions).

I have the pleasure of submitting as an honorary member of this Society the name of Dr. F. F. Johnson, of Chicago, and we are pleased to report that Dr. DUDLEY, of Chicago, is already an honorary member.

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Dr. JONES: I presume the committee will report later on additional names?

Pres. ALLPORT: They report every day.

Dr. BEARD: I move that the Secretary be instructed to cast the ballot of the Society in favor of the names that have been presented by the committee for membership.

The motion was seconded by Dr. BELL.

Dr. DAVIS: Before that motion is put we have another name that the chairman will present.

Dr. ANDREWS: The name of J. H. HILSCHER, a graduate of the University of Minnesota.

Pres. ALLPORT: Any remarks?

The motion of Dr. BEARD being put to vote prevailed.

Dr. HILL: I wish to announce right here that these gentlemen are expected to pay me $6.00 before they can become members of this Society. I am ready to receive the money.

Pres. ALLPORT: The gentlemen will please step forward and ante up. (Laughter.) Any other committees to report this morning?

Sec'y DONNELLY: I have, Mr. President, a bill here presented by Dr. P. O. Walling.

Dr. GROVES: I move an order be drawn on the treasurer for the amount.

The motion was seconded by Dr. HUNTER.

Pres. ALLPORT: Any remarks?

Dr. DAVIS: It looks to me as if it was a pretty heavy bill; possibly it may be all right. I came in late and only heard the report read. Perhaps a detailed statement of the bill might clear it up.

Dr. WALLING: The plan adopted, at least so far as I was concerned, was this: I sent out the envelopes with a one cent stamp on, and a stamped envelope for reply. All I sent out cost me three cents apiece. I sent out seven hundred, and the other members of the committee sent out enough to make up the balance, and the printing I had done at cost. The committee can use the blanks they have left another year. I do not ask anything for the work I have done, and some I hired done I ask no pay for; all I ask is to be reimbursed for the outlay I made.

Dr. DAVIS: Is there an auditing committee?

Pres. ALLPORT: There is a Finance Committee.

Dr. WALLING: I do not care where it goes, just so I am reimbursed.

Dr. DAVIS: What I meant was that it should be referred to the Finance Committee.

Dr. GROVES: Does that carry with it the putting over of this bill until next year?

Pres. ALLPORT: The Finance Committee can report on it tomorrow morning. Any further remarks?

Dr. GROVES: I accept the amendment.

A vote being taken, and the result being in doubt a division was called for, which showed a vote of 8 in favor and 27 opposed, and the motion was declared lost.

Dr. GROVES: I move an order be drawn on the Treasurer by the Secretary in favor of Dr. WALLING for the amount of this bill.

The motion was seconded by Dr. BELL, and being voted on, prevailed.

Dr. COCKBURN: There was a matter recommended by the committee on new members which, I think, is worthy of consideration; that is, as to the qualification of applicants for membership, the extent to which the committee on new members should investigate. I move the matter be referred back to the committee for further recommendation.

Dr. ANDREWS: The recommendation was that hereafter all applicants for admission into this Society bring or present to the committee on membership a certificate, properly signed by the secretary of the local society, if they are members of the local society where they reside, provided such a local society exists; otherwise they come recommended by two local physicians from the place where they reside.

Dr. BEARD: I would call the attention of the Society to the fact that that point is already covered by the constitution.

Dr. ANDREWS: Mr. President, it does not include it at all; it embodies a portion of it. If I may be permitted to do so, I will read it again.

Dr. COCKBURN: I wish to refer the suggestion of Dr. ANDREWS back to the committee to report it as an amendment to the constitution.

Dr. BEARD: The hour has come for the leaving of the cars, and I move that this matter be deferred until tomorrow morning, and that we now adjourn.

The Society then adjourned.

FRIDAY, JUNE 19.

The Society was called to order at 10:30 by the President, Dr. ALLPORT.

Pres. ALLPORT: The meeting will please come to order. I am requested by the Treasurer of the Society to say that the registration book is with him, and he would like to have every lady and gentleman who is present at this meeting put their names on the book before this meeting terminates.

The first order of business is miscellaneous business, and if you will allow me, I will dispatch a little bit of it myself. I wish to appoint the special committee on legislation that was suggested yesterday. I will appoint Dr. HALL, Chairman, and Dr. BEARD, of Minneapolis, Secretary, and the following additional members:

Dr. A. J. STONE, of St. Paul.
Dr. WM. DAVIS, of St. Paul.
Dr. P. H. MILLARD, of St. Paul.
Dr. THOS. MCDAVITT, of St. Paul.
Dr. C. A. STEWART, of Duluth.
Dr. S. M. STOCKER, of Duluth.
Dr. D. B. COLLINS, of St. Peter.

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Dr. H. H. WILCOX, of Albert Lea.
Dr. J. W. ANDREWS, of Mankato.
Dr. WALTER COURTNEY, of Brainerd.
Dr. T. L. HATCH, of Owatonna.
Dr. J. H. DUNN, of Minneapolis.
Dr. W. A. JONES, of Minneapolis.
Dr. A. W. ABBOTT, of Minneapolis.
Dr. C. G. WESTON, of Minneapolis.
Dr. J. W. BELL, of Minneapolis.
Dr. W. W. MAYO, of Rochester.
Dr. W. D. FLINN, of Redwood Falls.
Dr. D. M. COOL, of Faribault
Dr S. W. RANSON, of Dodge Centre.
Dr. J. B. MCGAUGHEY, of Winona.
Dr. A. T. CONLEY, of Cannon Falls.
Dr. A. O. GILMAN, of St. Cloud.

Dr. ALLPORT: Is there any other miscellaneous business?

Dr. HILL: I wish to move the reinstatement of Dr. C. M. FERRO, of Minneapolis.

The motion was seconded by Dr. BROWN, and, being voted on, prevailed unanimously.

Dr. ANDREWS: Can the committee on new members report under this head?

Pres. ALLPORT: Yes, sir; they can report under this head.

Dr. ANDREWS then submitted a list of names of applicants for membership.

Pres. ALLPORT: You have heard the report of the committee on new members; what will you do with it?

Dr. DAVIS: I move its acceptance and adoption.

The motion was seconded by Dr. STEWART and prevailed.

Dr. GROVES: I would move that the Secretary be instructed to cast the ballot of the Society in favor of the applicants for membership.

The motion was seconded by Dr. MAYO, and, being voted on, prevailed.

Dr. BEARD: I have another announcement to make in regard to railroad rates. There may be some present who were not present at the previous meeting. Let me say that the Great Northern and the Northern Pacific roads make a fare of one and one-third on the certificate plan. Members must have certificates from their ticket agents which they must present to the Secretary for endorsement, it being necessary that one hundred members have purchased tickets, or have such certificates, in order to secure a reduced rate. I have a telegram received from the St. Paul & Duluth. Their request is somewhat late, but it may be of some value to some members of the Society coming over that road. They also make a fare of one and one-third. I have several letters to read from Hon. C. K. Davis, W. W. Pendergast, A. Barto and D. M. Clough.

Dr. JONES: I simply want to announce to the Society that the Hennepin County Medical Society extends a cordial invitation to the State Medical Society to attend the smoke social this evening, with all that implies.

Pres. ALLPORT: What does it imply?

Dr. JONES: It applies tonight. (Laughter.) The program on the back of the invitations can be taken for what it is worth. Those who object to the program will be called on for remarks. (Laughter).

Dr. HILL: No man is a member, and his name will not appear on the register, unless he has my receipt for $6. (Laughter).

Dr: MCCOMB: I want to announce that a member of our Society, Dr. GOFF, of Duluth, is very ill in New York City, having been at the point of death for the past two weeks with pneumonia, but when I left him day before yesterday I saw a slight ray of hope. I thought it would be very complimentary to authorize the President to telegraph a message of sympathy to his family and express a hope for his speedy recovery.

Pres. ALLPORT: I think it needs no motion on the part of the Society to comply with Dr. MCCOMB'S suggestion.

Dr. ANDREWS: I have the following resolution to offer in regard to the reception of new members:

Resolved, By the Minnesota State Medical Society in convention assembled, that hereafter the committee on new members shall not at any subsequent convention of this body recommend for membership any applicant who is not a member in good standing of any county or other local society, a certificate of which in due form shall accompany the application; provided, however, that if the applicant does not live within the jurisdiction of any county or other local society, then he shall not be eligible for membership unless his application be endorsed by at least two regular physicians in good standing in the county where he resides.

Dr. ANDREWS: I move the adoption of the resolution.

The motion was seconded by Dr. DAVIS.

Dr. ANDREWS: No one realizes the importance of the care that should be exercised in the reception of new members more than the chairman of the committee on new members, hence this resolution has grown out of the report.

Dr. WALLING: There is a little objection to that resolution so far as the sparsely settled country of the north is concerned. If one physician should drop out there, and one would want to become a member of the State Society, it would take the unanimous consent of the physicians of the county to get him in. Still he might be an excellent man. It would seem that the recommendation of two member of this Society in good standing in the state would be sufficient, and that would let men in from sparsely settled counties; otherwise they would not get in at all.

Dr. ANDREWS: When this resolution was drawn

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up I think that matter was taken into account. It does not mean that he should be endorsed by two men in the place, but in the county, and it is presumed that there is no county in the state that has not at least three practising physicians. Applicants for membership come in here now and ask several members if they will not endorse them for membership; they do not like to refuse and they are voted in as members; but if this resolution is passed it does away with that, and the committee on membership can recommend to the Society for favorable consideration those who have been properly endorsed. The committee has met with a great deal of annoyance during this session. Our constitution provides in part the conditions of this resolution, and in part does not, but it makes it imperative on the part of the committee to adhere to the constitution as it is, and to adhere to the provisions of this resolution if it is passed. If you gentlemen had been on the committee on new members, you would see the necessity of having some such measure in force.

Pres. ALLPORT: This is a matter that affects our constitution, and it cannot be altered otherwise than by a year's notice.

Dr. BEARD: This is a constitutional question, and under the constitution it can be passed by a unanimous vote of the Society, otherwise it will have to go over to another year, and be passed by a two-thirds majority. When I spoke on the resolution yesterday I thought the constitution covered this point, but in looking it up I found Dr. ANDREWS was correct. In looking the matter up I noted the fact that at the time the constitution was revised (I happened to be a member of that committee) this point was then discussed, and these same questions came up at that time. There were counties in the state which had only three or four physicians, and it was found possible that if any one man wished to become a member, and he had an enemy among the other physicians in the county he could keep him out of the Society. Although the state is becoming more densely populated, more so than it was then, I presume there are parts of the state to which this still applies, and it might be doing an injustice to some worthy men.

Dr. BELL: Dr. BEARD has covered the ground pretty well. I am in favor of the resolution of Dr. ANDREWS, but it seems to me it ought to be in the form of an amendment to the constitution.

Dr. BRACKEN: We have heard from the sparsely settled districts, and I think we can speak for the more thickly settled districts. If this resolution were passed it would require everyone, a resident of a place of considerable size, to be a member of the county society. There are physicians in cities and towns who do not care to be members of the county societies, and in that case it would work an evil.

Dr. WALLING: Another word about the sparsely settled districts. Beltrami county has one physician. How he could get in I do not see. Our county has four, and two of them I would not ask to endorse my application if I wanted to join a hundred societies, and I think two of them feel the same towards me; they would not come to me for endorsement. (Laughter). So I do not see how we can increase our membership. They would not ask me and I would not ask them. I think Cass county has only one physician, the government physician at Leech Lake. How he could get into the the Society I do not see. I do not think that rule ought to prevail.

Pres. ALLPORT: This question will have to be passed unanimously in order to be passed this year.

A vote being taken on the question the motion was declared lost.

Dr. BEARD: Does that put it over?

Pres. ALLPORT: Not unless it is so moved.

Dr. DAVIS: I move that the resolution as read by Dr. ANDREWS be placed on file to be acted upon at the next meeting of the Society.

The motion was seconded by Dr. BELL, and being voted on prevailed.

Sec'y DONNELLY: I would like to make an announcement. I would like to have the gentlemen who have certificates for return transportation leave them with me, and I will return them at 2 o'clock. I have to take them down to the railroad office to show the agent how many have been in attendance at the meeting.

Pres. ALLPORT: Let me call on the different committees to report. Has the Publication Committee anything to report, or the Legislative Committee, the Committee on Necrology, or the Nominating Committee?

Dr. MOORE: The Nominating Committee respectfully submit the following report:

The Committee on Nominations would respectfully report as follows:

For Chairman of Section on Practice, H. B. SWEETZER.

For Chairman of Section of Surgery, J. W. LITTLE.

For Chairman of Section of Obstetrics and Diseases of Children, S. W. RANSON.

For Chairman of Section of Gynæcology, J. T. ROGERS.

Therapeutics, no nomination.

For Chairman of Section of Nervous Diseases, HAROLD SNEVE.

For Chairman of Section of Pathology and Physiology, H. A. TOMLINSON.

For Chairman of Section of Medical Education and Jurisprudence, C. L. GREENE.

Pres. ALLPORT: You have heard the report of the committee through the chairman, Dr. MOORE.

Dr. HALL: I move the adoption of the report.

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The motion was seconded by Dr. GROVES and others, and prevailed.

Pres. ALLPORT: Has the Finance Committee anything to report?

Dr. ANDREWS: Mr. President, I rise on behalf of the good citizens of Mankato and the Minnesota Valley to extend to this Society an invitation to meet in our city next year. We have ample hotel accommodations, we have ample room for the use of the Society during its sessions, we have a beautiful little city, well surrounded by wooded hills, and it will be a pleasure to the physicians to go into the country next year. We have an abundance of good, pure water, and we can guarantee that you can have all of that that you may wish. We have at present thirty-two saloons, but our $1,000 license will very much lessen that number by next year; however, we give you a hearty invitation to come to our town next year, and we will do all in our power to make the Society session a pleasant and a profitable one.

Dr. TOMLINSON: I would like to suggest to Dr. ANDREWS that if they cannot take care of all of them at Mankato we can make them comfortable at St. Peter. (Laughter).

Dr. DAVIS: I can second Dr. ANDREWS' invitation heartily, that you meet next year at Mankato. It is now twenty years since you were down there. Our organization was a very small one, but I say truly that those who were there were very cordially and heartily received. Those who were there will remember the grand hills, the beautiful vales, and the good water. Come! Come! We will cordially welcome you!

Dr. HALL: We have been repeatedly invited to go to Mankato, and I therefore desire to second the motion of Dr. ANDREWS to go to Mankato next year.

Pres. ALLPORT: Any further nominations for place of meeting?

The question being put to a vote the motion unanimously prevailed.

Pres. ALLPORT: The motion is carried, and we shall be very much delighted to meet with the Mankato physicians.

Next in order of business is the election of officers. The first thing is the election of President. Any nominations for President?

Dr. BEARD: It has been the custom in this Society for a certain rotation to be observed in respect to the office of President of the Minnesota State Medical Society. That rotation has accorded the presidency for one year to the city of St. Paul, the next year to the city of Minneapolis, and the third year to the country at large. There is a city in the state which is rapidly growing to proportions which commend it to the consideration of the State Medical Society as deserving a term of its own. In fact, it is growing so rapidly that, in the estimation of many, within a comparatively short time the Twin Cities may have difficulty in holding their own with the city at the head of the lake. Duluth has a candidate for the presidency who is a man whom I believe we shall all delight to honor. A man who stands at the head of the profession in that city; a man who has been active in its medical councils; a man who has taken a very active part in the meetings of the State Medical Society during the last few years. He is the representative choice of the men of that city I understand. Gentlemen, I am very glad to be accorded the privilege of putting in nomination this representative from Duluth, and I take great pleasure in nominating for the office of President of the State Medical Society, Dr. W. H. MAGIE, of Duluth. (Prolonged applause).

Dr. MCCOMB: Mr. President, I rise to second the nomination of a gentleman whom I have known for many years. I have known him long and intimately, and I predict that if elected he will perform the duties that devolve upon him as President with great credit to this Society. I take great pleasure in seconding for the highest office in the gift of this Society the nomination of Dr. W. H. MAGIE, of Duluth. (Applause).

Dr. ANDREWS: I have the name of a man to present to this Society for its consideration for the office of President next year, who possesses all the qualifications of the gentleman from Duluth. I have no set speech to make in regard to the gentleman, because he is too well known to this Society. I have more to say for him. He has been a worthy, hard-working member of this Society for twenty years past. During that entire time he has not missed a single session except on account of sickness. He is a hard-working physician, a skillful physician, and is most highly esteemed in the part of the country he comes from. In presenting his name, I present it in behalf of at least fifty per cent. of the members of this Society. In presenting his name, I present, as I said, a man who has been an active and worthy member of this Society for the past twenty years. In presenting his name, I present a man whose face and voice are familiar to everyone here. In presenting his name, I present a man from a portion of the state which has never been recognized by this Society. We all agree with Prof. BEARD that it is a time-honored custom that one year the presidency goes to St. Paul, another year to Minneapolis, and the third it is to go outside of those cities. I present the name of a man who has never sought office in this Society. I present the name of a man who does not this morning seek office in this Society, but I present him because his friends want him, and I sincerely hope the Society will bestow upon him this office as a reward of merit, and will take into account his active coöperation in the interests of this Society, and in saying what I do, I do not intend to say one word or reflect in any way upon the gentleman from Duluth, upon his friends or the

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city of Duluth. I recognize the city of Duluth as one of the great cities of Minnesota. Gentlemen, please recognize the fact that fifty per cent. of the membership comes from the rural district, and I feel that we should be recognized in the election of our honored friend, W. D. FLINN, of Redwood Falls. (Prolonged and enthusiastic applause).

Dr. BURTON: I take great pleasure in seconding the nomination of Dr. FLINN. I have known him for a great many years, and it is entirely unnecessary for me to say anything regarding his character and ability, because he is better known to most of the profession here than he is to me. I second Dr. FLINN's nomination.

Pres. ALLPORT: Are there any further nominations? If not, prepare your ballots for the two nominations. I will appoint Dr. DAVIS and Dr. CHILTON as tellers.

Pres. ALLPORT: It is suggested by the tellers that there may be repeaters in the hall. (Laughter). I think we shall collect no more ballots until the members are seated.

Sec'y DONNELLY: The following is the result of the ballot: Total number of votes cast, 81; of which Dr. FLINN receives 47 and Dr. MAGIE 34.

Dr. BEARD: I move the nomination of Dr. FLINN be made unanimous.

The motion was seconded by a number of gentlemen, and, being voted on, unanimously prevailed.

Pres. ALLPORT: The Chair will request Dr. ANDREWS and Dr. BEEBE to conduct Dr. FLINN to the platform, and also request him to make a few remarks to the Society.

Dr. FLINN was conducted to the platform by the gentlemen named amidst vociferous applause, and addressed the Society as follows:

Dr. FLINN: Gentlemen, I thank you heartily for the honor, the great honor, you have conferred upon me, and shall hope to merit your further esteem and approval in the work of the coming year. (Applause).

Pres. ALLPORT: The Chair regrets to announce that a little oversight has occurred. My attention has been called to Article III. of the Constitution under the head of "Place of Meeting." I will read it:

"The annual meeting shall be held alternately in the cities of Minneapolis and St. Paul, beginning the third Wednesday of June of each year, and holding over three days. The place of meeting may be changed by two-thirds of the members present at any regular meeting. A special meeting may be called upon petition of ten members; twenty days' notice thereof shall be published in the daily papers of St. Paul and Minneapolis."

The Chair is unable to decide whether a two-thirds vote was cast in favor of Mankato or not.

Dr. HALL: I think those who were here will bear me out that the vote was unanimous.

Dr. DORSEY: I think the gentlemen will make a mistake to meet in a small town. In meeting in the two cities every physician always has some business to attend to and he takes that opportunity of doing it, and I move we reconsider the vote.

Dr. DAVIS: It would be profitable and a luxury to many members of this Society to attend these meetings instead of their other business. They could have an elegant opportunity to do it at Mankato.

Pres. ALLPORT: The place of meeting is open for discussion.

Dr. ROBINSON: When a motion to reconsider comes before the house, it is always necessary to be made by one who voted in the affirmative. I raise that point of order.

Pres. ALLPORT: The chair accepts the point of order. I think it would be wise for some member who voted in the affirmative to move to reconsider. The probability is the Society will take the same action, but it is the proper way to bring the matter before the Society.

Dr. COCKBURN: As there seems to be no one who is willing to move to reconsider, I move the selection of Mankato be made unanimous.

The motion was seconded by Dr. DAVIS and others, and being voted on unanimously prevailed.

Pres. ALLPORT: Any nominations for First Vice President?

Dr. HALL: I would like to nominate for First Vice President Dr. DAVID OWEN THOMAS, of Minneapolis.

Dr. MOORE: I second the nomination.

Dr. DAVIS: There being no other nominations I would move that the Secretary be instructed to cast the ballot of the Society for Dr. THOMAS for First Vice President.

The motion was seconded by various gentlemen, and being voted on Dr. THOMAS was declared unanimously elected.

Pres. ALLPORT: Next in order is the nomination for Second Vice President.

Dr. STODDARD: I move that Dr. D. M. JONES, of Gaylord, be elected Second Vice President, and that the Secretary be instructed to cast the ballot of the Society in his favor.

Dr. SIMPSON: I second the motion.

A vote being taken Dr. JONES was unanimously elected as Second Vice President.

Pres. ALLPORT: Third Vice President.

Dr. JONES: I nominate Dr. WILLIAMS, and move that the Secretary be instructed to cast the ballot of the Society for Dr. Williams.

The motion was seconded by Dr. BEARD, and unanimously prevailed.

Pres. ALLPORT: The next is the nomination for Secretary.

Dr. DAVIS: I would nominate Dr. IGNATIUS DONNELLY, of St. Paul. I move that the Secretary be instructed to cast the ballot of the Society for Dr. DONNELLY. (Laughter).

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Pres. ALLPORT: The Secretary has cast the ballot and Dr. DONNELLY is elected. (Laughter). Who will you have for Treasurer?

Dr. JONES: I rise to nominate a new man, the Rt. Rev. Dr. DAVID DICK HILL, as Treasurer of the Society. (Great laughter and applause). I move that the Secretary be instructed to do as usual. (Laughter).

The motion was seconded and Dr. HILL was unanimously elected.

(Cries of "Speech," "Platform").

Dr. HILL: Gentlemen, I thank you for this recognition of my services. I have nothing to say, except that I will make no reduction in the dues, and will endeavor to collect if not paid. (Laughter).

Pres. ALLPORT: We must elect two censors to serve one year. Will you please put some one in nomination.

Dr. BELL: I nominate Dr. E. J. DAVIS.

Pres. ALLPORT: He is already one of the censors.

Dr. HALL: The two outgoing gentlemen are elected for one year. The men that we elect are elected for three years.

Dr. DAVIS: The outgoing members are Dr. A. J. STONE and Dr. J. H. DUNN.

Dr. HALL: They have two years to serve.

Pres. ALLPORT: Put any two out you want to. (Laughter).

Dr. HALL: I move that the present incumbents, Dr. MAYO and Dr. STAPLES, be reëlected for the full term of three years.

The motion was seconded by Dr. BEARD, and on vote the gentlemen were unanimously elected.

Pres. ALLPORT: The report of the committee on nominations has already been made, so according to the program there is nothing further to do for the Society except to adjourn, unless there is some miscellaneous business to transact.

Dr. BELL: I think it is the custom for the retiring President to make a speech.

Pres. ALLPORT: I have been doing nothing but speak all the time for the last three days. I assure you, gentlemen, I have nothing in addition to say, except that I have deeply appreciated the honor of presiding over your deliberations, it being the highest honor in the power of the profession of the state to bestow, and I can assure you, gentlemen, that nothing in my life has ever appealed to me in a professional way so much as the election to the presidency of the Minnesota State Medical Society. I thank you, gentlemen, for the honor, and I thank you for the kind indulgence you have given me, from the fact that I have not been as good a presiding officer as many, not having been President of the Society but once, and I trust when we shall come together at Mankato, next year, we shall not be deterred from going there on account of the size of the city. I have been to Mankato attending meetings of the Minnesota Valley Association, and I can assure you I have always been most cordially received, and I feel that none of you will ever regret having attended the next meeting of the Society at Mankato. Gentlemen, I thank you. (Applause).

Pres. ALLPORT: Is there any miscellaneous business to come up before we adjourn?

Sec'y DONNELLY: I would like to state that I will have the certificates of the gentlemen here on the desk at 2 o'clock.

Pres. ALLPORT: I hope that we shall have a good attendance at the smoke social this evening. The executive committee has exerted itself considerably to make this smoke social an event in the history of the Society. The executive committee deliberated at great length as to what it could do to best show the Society its appreciation of the honor it had conferred upon the members of the profession of Minneapolis to have the Society meet here. Of course, it has been the time-honored custom to hold a banquet with post-prandial speeches, but we thought it might be a good thing to make a departure from the old stereotyped banquet and give you something new, so that we may look back upon the meeting held in Minneapolis as a new departure in the way of entertainment. The smoke social will be held in the large dining room of the West Hotel. The accommodations will be ample, and the water, while, perhaps, not as clear a liquid as the fluid dispensed at Mankato, is good, nevertheless; and I am informed that there will be other attractions presented, and I hope we shall have a large meeting at the smoke social this evening.

If there is nothing further to do, gentlemen, the Chair will entertain a motion to adjourn.

On motion of Dr. BELL the meeting adjourned.

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PRESIDENT'S ADDRESS.

CHANGES IN THE CORONER'S LAWS.

By Frank Allport, M. D.

Minneapolis.

Ladies and Gentlemen of the Minnesota State Medical Society:

It is with the greatest pleasure that I again witness the gathering together of the members of this association. Year by year this function is repeated, and while we are hopeful that each succeeding meeting adds something to the cause of medical, surgical and sanitary progress, we are sure that it enhances the cordial and fraternal feeling that should exist between physicians working together within the narrow confines of a single state. Allow me, as your presiding officer, to suggest, however, that while not desiring to discourage the mingling together in a social way of our members, and the witnessing of operations, clinics, etc., I would at the same time beg that such partial deflections from the object of our meeting be performed at times not conflicting with the hours of our business and scientific sessions. By harmonizing your conduct to this reasonable request you will greatly enhance the value and importance of this meeting, by not removing those from our daily attendance who are so capable of adding life and spirit to the debates following the reading of the different papers.

I am sure that I voice the sentiments of the good people of Minneapolis when I bid you again welcome to our homes, hearts and hospitality, and I sincerely trust that when you shall have concluded the work of this session, and your faces are turned homeward, you will feel that it has been indeed the banner meeting of the association, and that the warm and friendly relations already existing between the profession of Minneapolis and that of the state at large, have been materially cemented and strengthened.

And now I will invite your attention for a few moments to a subject that is attracting comment and action in the different states, and that should receive the attention of the profession and legislators of the state of Minnesota. I refer to inevitable and necessary changes in the coroner laws. In the brief time that I have deemed proper to allot to my address, it is not possible to treat the subject exhaustively, nor is it necessary, as many physicians in the state understanding the matter much better than I, can take up the discussion upon subsequent occasions, or be placed upon a committee to sift the arguments pro and con, and present the crystallized thought of the profession to the legislature at its next session, with a prayer for desirable and salutary changes.

We are essentially working under a coroner law originating in England about one thousand years ago. This of itself should cause us to pause and reflect, whether a legal enactment bearing upon the science of medicine framed to represent medical progress at that time, is suitable for the development incident to the present day; for while antiquity is by no means a synonym for defectiveness, it is well to be sure that anything correlative to medical advancement is fully abreast of the times.

The office of coroner is one of the farces of our governmental system. It reminds me of the opera "Iolanthe," where, before the Lord High Chancellor can marry his own ward, he is compelled, in accordance with the laws of England, to ask his own consent to the marriage, and to await breathlessly for the relenting tear of approval to appear in his own official eye.

A coroner, under our present system, *should* be a man of dual existence, both a competent physician and able attorney. In reality, neither is essential, but he must be a capable politician.

I have heard of a physician in one of the rural counties, who seems to be able to grasp the situation and to fully cover the Pooh-Bah existence of the modern coroner. He views the remains, holds court, subpœnas himself to appear before himself, swears himself in as his own assistant, hears his own testimony, swears in the jurors, in fact does everything that is necessary, including the collection of all the fees, and yet has not an international reputation. While it may be possible for one man to accomplish such multifarious duties, yet an intellect and an assurance like this is no criterion to go by, and the law should not exact the qualifications of an impossible man. It may have been an official of this type who inspired the awe and fear which rendered possible the following occurrence which I find in one of the medical journals:

"There is a curiously exaggerated notion among ignorant people as to the importance and dignity of the coroner, and it is seldom that any one can be found who is bold enough or rash enough to touch the body of one who has met with sudden or violent death until the coroner or his deputy has 'viewed the remains.' This is doubtless well enough when the person is actually dead, but it is carrying it a little too far when, as actually happened the other day in Brooklyn, it operates to prevent the saving of life. Not long ago a young

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girl was found by her aunt hanging from the rafters of an outhouse. When first seen she was still alive and struggling fearfully. Her aunt was too frightened to do anything but scream, and some of the women neighbors who were attracted to the scene actually prevented one of their number from cutting the poor girl down, saying that she could not be touched until the coroner gave permission. When the latter finally came the girl was dead. The coroner is always an object of dread and fear to these poor folks, but that this fear of him should lead a number of women to make not the least effort to save the life of one of their friends dying before their very eyes, is something almost incredible."

Fortunately, or unfortunately, the coronership of Hennepin and Ramsey counties has always been in the hands of capable physicians, as far as my knowledge extends; it therefore may be difficult to arouse professional sentiment on the subject in those counties, but it should be looked upon from a purely impersonal standpoint, and laws enacted that will provide against future inefficiency; the only wonder being that a law of such manifest assailibility and scientific absurdity should have been tolerated in any civilized and progressive community for so many centuries. So it will be seen that while a coroner should be a medical man, capable of intelligently viewing a dead body dying under suspicious circumstances, and of determining between natural and criminal conditions, of scientifically making a post mortem, and ascertaining the cause of death, of performing a chemico-analytical examination of the stomach, bowels and other portions of the body; and a lawyer, capable of properly holding an inquest and correctly supervising the general proceedings, to see that everything is accomplished according to the law bearing upon such cases; in reality, in most states it is not necessary for him to be either one thing or the other. Under such circumstances it will clearly be necessary for him to delegate some or all of these duties to assistants, and to sign papers and vouch for opinions which should be his, but in reality are those of his agents, and about which he may be personally intensely ignorant. When it is unnecessary for the coronorship to be held by a medical man, it is also unnecessary for his assistants to be medical men. This is optional with the coroner, who can appoint a physician as his deputy or not as he sees fit. A coroner should not be allowed to appoint his own deputies, for, while good ones *may* be appointed, the principle is wrong, as the coroner may be corrupt and sell the offices, or, as is usually the case, appoint some political or medico-political friends, who have been instrumental in securing his election; or, as frequently happens, especially in large cities, the coroner is one of a ring, elected under the supervision of a "boss," who also dictates to the coroner who his assistants shall be, thus rendering their removal impossible, without the consent of this "boss." The whole thing is rotten, so much so indeed, that it will take the labor of more than one committee or legislature, to purge and purify it, so that this work may be accomplished with benefit to the community and the world of science.

As an evidence of the supreme ignorance of the unmedical coroner upon medical topics, an instance may be given of a coroner in New York, not long ago, asking a witness if the "rigor mortis" was a sure sign of death, and of another who asked if there was any way of determining if a post mortem had been performed before death. One of the dangers of an unmedical coroner was shown in 1891, when one of the coroners of New York City declared that all cases of death from Koch's lymph should be subject to investigation, with a possibility of indictment for manslaughter. While recognizing the limitations of experimental medicine and surgery, and the bearings it has upon human life, it is nevertheless not only absurd but reprehensible for a coroner to usurp his official position by presuming to place a curb upon medical progress and investigation by holding over the heads of honest workers the fear of a state's prison. In the first place, he exceeds his authority and displays his ignorance in issuing such a mandate, as the law does not provide that such cases shall pass under the supervision of a coroner at all; and, in the second place, I should like to know by what right, either human or divine, an ignorant, pot-house political ringster is to become the self appointed mentor of intelligent medical progress and therapeusis.

One of the evils of the present system that originates either in an unmedical coroner or an inefficient medical coroner is the delay that frequently happens between the discovery of a suspicious death and an autopsy, owing to ignorance of the extreme value of an early examination after death has occurred. Such a delay often means the escape of a criminal, whose detection might have been possible had a post mortem been made when the body and its contents were fresh and susceptible to superior pathological, microscopical and toxicological examinations, or possibly owing to the inefficiency in the coroner's office, or coroner's jury, which is usually composed of ignorant loafers and court habitues, whose only desire is to collect a fee as soon as possible, a necessary autopsy may be altogether omitted and the criminal find his path to liberty practically unobstructed.

And now let me ask, of what use is a coroner's jury? So far as can be seen it is of no use whatever, and is simply a useless and threadbare relic of antiquity, and an absolutely unnecessary and incomprehensible expense to the commonwealth.

The conclusions decided upon by a jury at an inquest are not in the slightest degree conclusive; indeed they are not even evidence, and the subse-

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quent trial may, and usually does, proceed without any reference to the verdict whatever. The trial by jury is dear to the heart of the English-speaking people, to whose mind such a proceeding is inseparable from that of openhanded justice. But of what advantage is a jury inquest, whose verdict is simply the mouthings of the coroner and his deputies, which absolutely plays no part whatever in the subsequent trial, and is an actual hindrance to the determination of death and the detection of crime by delaying autopsical and other examinations of the body, which can most advantageously and scientifically be accomplished as soon after death as possible. It must be remembered that the abolition of a coroner's jury does not in any sense do away with a citizen's right to be tried by a jury of his peers, for before conviction is possible he must pass through the two ordeals of a grand jury and a trial jury hearing.

If, then, the conclusions are reached that the requirements of the coroner's office are impossible of fulfillment by an ordinary man, and should be so outlined or changed as to make their accomplishment possible and consistent with the best ends of justice, and if it be determined that the coroner's jury is a useless expense and harmful excresence upon an overtaxed and suffering community, what means can be devised for the abolishment of these systems and the establishment of new ones, by which suspicious deaths can be examined in the most approved, thorough and equitable manner, with the least publicity and expense possible?

In pursuance of this line of thought, and with the hope of inaugurating a better state of affairs, Dr. H. O. Marcy and Mr. Theodore H. Tyndale, a distinguished attorney of Boston, aided by leading members of both their professions resident in the state of Massachusetts, in 1877, succeeded in securing the passage of a law embodying advanced views on the subject, and which I take pleasure in distributing among you, as it is too long to constitute a portion of this address. The essential features in this law, as expressed by Dr. Marcy, are as follows:

1. The abolishment of the office of coroner.
2. The abolishment of the trial by jury.
3 The separation of the medical from the legal duties in all cases involving the examination into the causes of death where crime is suspected.
4. To entrust the medical examination only to competent medical officers properly trained in their work.
5. To make the number of these medical officers as small as consistent with the proper discharge of their duties.
6. To consign all questions of law only to properly qualified legal magistrates.
7. To remove the appointment of these officers entirely from the question of political consideration, and to be based only upon their possession of the requisite and proper qualifications.

As to the proper workings of the Massachusetts law I beg leave to quote from an eminent physician, Dr. S. W. Abbott, Secretary of the Massachusetts Board of Health, and T. H. Tyndale, Esq., of Boston, Mass. Dr. Abbott says:

"Under the new regime about fifteen thousand cases of death from sudden, suspicious, violent or unknown causes have been investigated in a manner much more satisfactory than was possible under the old system. Another important feature of the new method is the decided lessening of expense. Under the coroner system the cost of executing the law for three years, 1874, 1875 and 1876, was found to be $63,612.04, and under the new law it was $54,509.31 for the three years 1878, 1879 and 1880, a decrease of $9,202.73, or more than $3,000 per year, notwithstanding an increase of the population of about eight per cent. The principal reasons for this diminished expense are found in the abolition of the jury and in the decrease of the number of inquests. The ratio of inquests to cases investigated under the old law was 407, while under the present law, for the period of eleven years (1877 to 1888) it has been but 20 per cent., or half as many."

Mr. Tyndale says:

"With the abolition of the composite functionary aid of the jury, a trained class of 'medical examiners,' an office gladly accepted by the first physicians in the state, we open the door for special interest in and previously unknown penetration into fields of detailed investigation of pathology; we have laid the foundation of a valuable body of obscured facts, as shown by the publication of our Medico-Legal Transactions, contributed entirely by the medical examiners; we have attained accuracy, and we have never, since the passage of the Medical Examiner Act, failed in a single prosecution for want of sufficient clearness of the medical testimony. The previous statistics were, some hundreds of inquests annually, some tens of convictions. Now, the great majority of prosecutions begin with the skillful investigation of trained men, acting promptly, and delayed by no cumbersome meaningless machinery, and end in convictions. We have attained that greatest determent of crime—the chief terror to criminals—swiftness in discovery and certainty in punishment. Incidentally, a gain dear to the lover of social cleanliness and morality has been obtained. I refer to the total disappearance from the press, except as news from other states, of the nauseous and offensive details, formerly furnished by the coroner's inquest and eagerly sought after by the prurient curiosity mongers. These changes have been wrought by a simple act, abolishing the office of coroner and appointing for Boston, two, for each other county in the state some four medical examiners, whose business is solely the physical

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examination and subsequent giving of testimony. * * * The new system has now been in operation about twe've years and has proved itself capable of exact and valuable work; no instance of willful dereliction of duty under it has taken place. It has now the commendation of judges and the general public, and may fairly be pronounced a step in the direction of purifying the public service."

Words like these, from men of high professional and social position, especially when deemed worthy of verbatim quotation by as eminent an authority as Dr. Henry O. Marcy, cannot and should not fail to carry weight, and it is to be hoped that the impression thus formed may be sufficiently penetrating and permanent to insure the passage of a salutary coroner law in our own state of Minnesota. Connecticut and Rhode Island have a similar law to that of Massachusetts in successful and satisfactory operation, and this year New York hopes to swing into line. The question naturally will be impregnated with a diversity of views even after it is determined that the present method is defective and must be changed. In Massachusetts, for instance, the medical examiners are appointed in Suffolk county (where Boston is situated) by the governor. There are two of them and they each receive a salary of $3,000 per annum. Other counties in the state are divided into suitable districts by the county commissioners and a medical examiner appointed for each district. They receive, for a view of a dead body, a fee of four dollars without an autopsy, thirty dollars with an autopsy, and travel at the rate of five cents per mile to and from the place of the view. They hold office for seven years unless removed through cause by the governor, and furnish a five hundred dollar bond. In brief, the duty of a medical examiner is to view and take charge of a body meeting with a suspicious death, and if he deems a careful examination and autopsy necessary, he shall obtain authority from the district attorney, or some other qualified official, and shall have the power of issuing subpœnas upon two or more discreet persons to assist him and serve as witnesses of the proceeding. If an examination leads him to believe that violence has been enacted in the death, he shall at once report the affair to the district attorney and other proper authorities. A court or trial justice shall thereupon hold an inquest, which may be private, and in the presence of the district attorney or his agent, and to which the medical examiner, and all other desirable witnesses may be compelled to give attendance. The report shall be presented in full to the district attorney, who is vested with the power to conduct an inquest, as just outlined, even if the medical examiner brings in a report, giving it as his opinion that the deceased did *not* come to his death by violent means. The medical examiner may call an analytical chemist to assist in the examination of the body, and may regulate the fee of said chemist. This is a bare, but practical, outlining of the methods prevailing in Massachusetts which have given such general satisfaction, and it embodies the essential principles involved in the work of reformation, either accomplished or projected in other states.

Some variations in the details are advanced, such as the appointment of medical examiners by county judges, or by the appellate division of the supreme court; the merging of the office of medical examiner into the board of health system; the appointment of regular expert pathologists and chemists as co-workers with the medical examiners, etc., etc., but the main principle of the revolution is found in the Massachusetts law, and it has proven so eminently satisfactory in that state, I would recommend that at least a similar law be presented to the next legislature of this state, emanating from the Minnesota State Medical Society. I would recommend that a committee of twenty-five be appointed by this Society to take the matter in charge, and as the next session of the legislature is to be held this coming fall, this committee should be vested with the power to act, in order that time may not be lost.

It may occur to some, as it did to me, that as the Massachusetts law has now been in existence nearly twenty years, defects in its conception must have become apparent and that numerous corrections must have defaced its original outlines. With this in view I wrote Dr. H. O. Marcy and Dr. S. W. Abbott, Secretary of the Massachusetts State Board of Health, for information, and received the following letters:

"DEAR DR. ALLPORT: It is a pleasure to comply with your request. Our law is working without criticism. All that I have published upon the subject of the coroner system might be emphasized by our experience. I have referred your letter to Dr. Abbott, secretary of our State Board, who will give you better detail of our law than I possess. I saw him in person about it. Push on the good work. Sincerely,

"HENRY O. MARCY.

"180 Commonwealth Ave., March 24, 1896."

"Boston, March 28, 1896.

"Dr. Frank Allport, President Minnesota State Medical Society, Minneapolis, Minn.

"DEAR DOCTOR: My friend, Dr. Marcy, has handed me your letter making inquiries in regard to the present inquest law of Massachusetts. In reply to your questions seriatim: The law enacted in 1877 abolishing the old coroner and his jury is still in force in this state and has been a perfect success. Slight modifications were enacted in 1885, but they do not materially affect the original law. You will find the law, together with the amendment of 1885, in Wood's Reference Hand-

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Book, volume 2, article 'Examiner.' Other information in the same direction may be found in the same volume under the head of 'Coroner.' The Connecticut and Rhode Island laws are only halfway measures. I am not familiar with the proposed New York law.

"If you are to make any changes in your present law, by all means make the radical change and get rid of the coroner and his jury entirely. The law will work just as well in a comparatively sparcely settled community as in the densely crowded city. Our sparsely settled Berkshire county, Franklin county and Cape Cod, and the densely settled city of Boston are good illustrations. In reply to your last question—we have no printed copies of this law. Yours truly,

"SAM'L W. ABBOTT, Secretary."

Thus it will be seen that this law is exactly as it was in 1877, and that it has rendered general and satisfactory service; and I beg leave to suggest that a law which is good enough for an old and conservative state like Massachusetts, is surely good enough for us.

There may be some who doubt the possibility of securing the passage of such a law. I am confident that this is an erroneous view to entertain. The medical profession of Minnesota can accomplish the passage of any just law if *united* and *determined*. But work of this kind must be performed in a manner consistent with the methods of modern political warfare. Nothing can result if we indulge simply in generalizations, hopes, random interviews, etc., etc. The work must be systematic, businesslike and emanate from a central bureau, or committee, who shall have the liberty of framing its own policy, and the power to carry it out. Every legislator in the state should be approached under the most favorable circumstances by individuals in whose judgment he shall have the greatest confidence. Owing to the nature of the desired bill and its medical bearings, the legislator's family physician will probably be the best agent to undertake this work, which can be advocated without any infringement of conscientious scruples, because the cause is just and right and should prevail. Various ways and means can be devised to carry on this work by a competent and earnest committee, but it is only by some such systematic and businesslike machinery that our object can be attained.

That discouraging legislation can be accomplished by combined and systematic work on the part of the medical profession, is abundantly proven by the passage of the Kentucky Practice Act, which vests in the state board of health absolute and autocratic power as to who shall practise medicine within the borders of the state. This purification act enables the state board to take away a man's license to practise, even though he be a regular graduate and duly licensed, provided he sees fit to advertise, or conduct himself in a manner unbecoming the medical profession. The result is, as Dr. Matthews, President of the State Board of Health, informs me, that there is not a single advertising physician in the state of Kentucky; and this board has proclaimed a standing offer of one hundred dollars for every medical advertisement that can be produced in the state. Some have questioned the constitutionality of this law, but it has been carried to the supreme court, and approved, and is now in successful operation, a benefit to mankind, and a conspicuous example of the possibilities of a united, earnest and determined medical profession.

THE MASSACHUSETTS CORONER LAW.

PASSED IN 1877.

An Act to Abolish the Office of Coroner, and to Provide for Medical Examinations and Inquest in Cases of Death by Violence.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same as follows:

SECTION 1. The officers of coroner and special coroner are hereby abolished.

SEC. 2. The governor shall nominate, and by and with advice and consent of the council shall appoint, in the county of Suffolk, not exceeding two, and in each county not exceeding the number to be designated by the county commissioners as hereinafter provided able and discreet men, learned in the science of medicine, to be medical examiners; and every nomination shall be made at least seven days prior to such appointment.

SEC. 3. In the county of Suffolk each medical examiner shall receive in full for all services performed by him an annual salary of three thousand dollars, to be paid quarterly from the treasury of said county; and in other counties they shall receive for a view without an autopsy, four dollars; for a view and autopsy, thirty dollars, and travel at the rate of five cents per mile to and from the place of the view.

SEC. 4. Medical examiners shall hold their offices for the term of seven years from the time of appointment, but shall be liable to removal from office at any time by the governor and council for cause shown.

SEC. 5. Each medical examiner, before entering upon the duties of his office, shall be sworn and give bond, with sureties, in the sum of five hundred dollars, to the treasurer of the county, conditioned for the faithful performance of the duties of his office. If a medical examiner neglects or refuses to give bond as herein required, for the period of thirty days after his appointment, the same shall be void, and another shall be made instead thereof.

SEC. 6. The county commissioners in each

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county shall, as soon as may be after the passage of this act, divide their several counties into suitable districts for the appointment of one medical examiner in each district under this act; and when such division is made, shall at once certify their action to the secretary of the commonwealth, who shall lay such certificate before the governor and conncil. But nothing herein shall prevent any medical examiner from acting as such in any part of his county.

SEC. 7. Medical examiners shall make examinations as hereinafter provided, upon the view of the dead bodies of such persons only as are supposed to have come to their death by violence.

SEC. 8. Whenever a medical examiner has notice that there has been found, or is lying within his county, the dead body of a person who is supposed to have come to his death by violence, he shall forthwith repair to the place where such body lies and take charge of the same; and if, on view thereof, and personal inquiry into the cause and manner of the death, he deems a further examination necessary, he shall, upon being thereto authorized in writing by the district attorney, mayor or select men of the district, city or town where such body lies, in the presence of two or more discreet persons, whose attendance he may compel by subpœna, if necessary, make an autopsy, and then and there carefully reduce or cause to be reduced to writing every fact and circumstance tending to show the condition of the body, and the cause and manner of death, together with the names and addresses of said witnesses, which record he shall subscribe. Before making such autopsy he shall call the attention of said witnesses to the position and appearance of the body.

SEC. 9. If, upon such view, personal inquiry or autopsy, he shall be of opinion that the death was caused by violence, he shall at once notify the district attorney and a justice of the district, police or municipal court for the district or city in which the body lies, or a trial justice, and shall file a duly attested copy of the record of his autopsy in such court, or with such district attorney; and shall in all cases certify to the clerk or registrar having the custody of the records of births, marriages and deaths in the city or town in which the person deceased came to his death, the name and residence of the person deceased, if known, or a description of his person as full as may be for identification, when the name and residence cannot be ascertained, together with the cause and manner in and by which the person deceased came to his death.

SEC. 10. The court or trial justice shall thereupon hold an inquest, which may be private, in which case any or all persons other than those required to be present by the provisions of this chapter may be excluded from the place where the same is held; and said court or trial justice may also direct the witnesses to be kept separate so that they cannot converse with each other until they have been examined. The district attorney, or some person designated by him, may attend the inquest, and may examine all witnesses. An inquest shall be held in all cases of death by accident upon any railroad, and the district attorney or the attorney general may direct an inquest to be held in the case of any other casualty from which the death of any person results, if, in his opinion, such inquest is necessary or expedient.

SEC. 11. The justice or district attorney may issue subpœnas for witnesses, returnable before such court or trial justice. The persons served with such process shall be allowed the same fees, and their attendance may be enforced in the same manner, and they shall be subject to the same penalties as if served with a subpœna in behalf of the Commonwealth in a criminal prosecution pending in said court or before said trial justice.

SEC. 12. The presiding officer or trial justice shall, after hearing the testimony, draw up and sign a report in which he shall find and certify when, where and by what means the person deceased came to his death, his name, if known, and all material circumstances attending his death; and if it appears that his death resulted wholly or in part from the unlawful act of any other person, he shall further state, if known to him, the name of such person, and of any person whose unlawful act contributed to such death, which report he shall file with the records of the superior court in the county wherein the inquest is held.

SEC. 13. If the justice finds that murder, manslaughter or an assault has been committed, he may bind over, as in criminal prosecutions, such witnesses as he deems necessary, or as the district attorney may designate, to appear and testify at the court in which an indictment for such offense may be found or presented.

SEC. 14. If a person charged by the report with the commission of any offense is not in custody, the justice shall forthwith issue process for his apprehension, and such process shall be made returnable before any court or magistrate having jurisdiction in the premises, who shall proceed therein in the manner required by law. But nothing herein shall prevent any justice from issuing such process before the finding of such report if it be otherwise lawful to issue the same.

SEC. 15. If the medical examiner reports that the death was not caused by violence, and the district attorney or attorney general shall be of a contrary opinion, either the district attorney or attorney general may direct an inquest to be held in accordance with the provisions of this act, notwithstanding the report, at which inquest he, or some person designated by him, shall be present and examine all the witnesses.

SEC. 16. The medical examiner may, if he deems it necessary, call a chemist to aid in the examination of the body, or of substances sup-

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posed to have caused or contributed to the death, and such chemist shall be entitled to such compensation for his services as the medical examiner certifies to be just and reasonable, the same being audited and allowed in the manner herein provided. The clerk or amanuensis, if any, employed to reduce to writing the results of the medical examination or autopsy, shall be allowed for his services two dollars per day.

SEC. 17. When a medical examiner views or makes an examination of the dead body of a stranger, he shall cause the body to be decently buried; and if he certifies that he has made a careful inquiry, and that to the best of his knowledge and belief the person found dead is a stranger, having no settlement in any city or town of this commonwealth, his fees with the actual expenses of burial shall be paid from the treasury of the commonwealth. In all other cases the expenses shall be paid by the city or town, and all other expenses by the county wherein the body is found.

SEC. 18. When services are rendered in bringing to land the dead body of a person found in any of the harbors, rivers or waters of the commonwealth, the medical examiner may allow such compensation for said services as he deems reasonable, but this provision shall not entitle any person to compensation for services rendered in searching for such dead body.

SEC. 19. In all cases arising under the provisions of this act, the medical examiner shall take charge of any money or other personal property of the deceased, found upon or near the body, and deliver the same to the person or persons entitled to its custody or possession; but if not claimed by such person within sixty days, then to a public administrator, to be administered upon according to law.

SEC. 20. Any medical examiner who shall fraudulently neglect or refuse to deliver such property to such person within three days after due demand upon him therefor, shall be punished by imprisonment in the jail or house of correction not exceeding two years, or by fine not exceeding five hundred dollars.

SEC. 21. The medical examiner shall return an account of the expenses of each view or autopsy, including his fees, to the county commissioners having jurisdiction over the place where the examination or view is held, or in the county of Suffolk to the auditor of the city of Boston, and shall annex thereto the written authority under which the autopsy was made. Such commissioners or auditor shall audit such accounts and certify to the treasurer of the commonwealth, or the treasurer of the county, as the case may be, what items therein are deemed just and reasonable, which shall be paid by said treasurer to the person entitled to receive the same.

SEC. 22. Whenever any sheriff is a party to a suit or proceeding, or otherwise disqualified to act therein, the sheriff or a deputy sheriff of any adjoining county may serve and execute all writs and precepts, and perform all duties of such sheriff which he is disqualified to perform, and may serve and execute all such writs and precepts wherein any county, town, parish, religious society, or school district is a party or interested, notwithstanding he is at the time a member of such corporation.

SEC. 23. Whenever a vacancy occurs in the office of sheriff of any county, the senior deputy sheriff in service shall perform all the duties required by law to be performed by the sheriff until the office of sheriff is filled in the manner required by law, giving bond as now required by law of sheriffs. And in case of such vacancy, the deputies of the sheriff vacating the office shall continue to have and exercise the power of deputy sheriffs until said office is filled as aforesaid.

SEC. 24. Sections seventy-five, seventy-six and seventy-seven of chapter seventeen, and section one hundred of chapter sixty-three, and section eighteen of chapter one hundred and sixty-three of the General Statutes are hereby amended by substituting for the word "coroner," wherever the same occurs, the words "medical examiner," and for the word "coroners" the words "medical examiners." The second clause of section fifty-two, and sections seventy-four, seventy-eight, seventy-nine and eighty of chapter seventeen of the General Statutes, chapter one hundred and seventy-five of the General Statutes, chapter one hundred and thirteen of the acts of the year eighteen hundred and sixty-one, chapter one hundred and seventy-two of the acts of the year eighteen hundred and sixty-two, chapter twenty-eight of the acts of the year eighteen hundred and sixty-two, chapter twenty-eight of the acts of the year eighteen hundred and sixty-four, chapter two hundred and forty-one of the acts of the year eighteen hundred and seventy-one, and chapter one hundred and fifteen of the acts of the year eighteen hundred and seventy-six, and all other acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 25. For the purposes of appointment and qualification of medical examiners and the action of the county commissioners herein provided for, this act shall take effect upon its passage, and it shall take full effect on the first day of July next.

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OBSTETRICS AND DISEASES OF CHILDREN

W. A. CHAMBERLIN, M. D., Chairman.

ENURESIS NOCTURNA.

BY W. A. CHAMBERLIN, M. D.

St. Charles.

My brief allusions to the general pathology and history of this usually much ignored affliction of more than ordinary frequency, annoyance and importance, with a few mild suggestions as to its management and treatment, are respectfully submitted, with the hope that they may be accepted as a mere text, from the consideration and discussion of which by those present we may receive much additional enlightenment regarding the subject, including its long train of objectionable and pernicious consequences.

I am fully aware that, though this deplorable condition is not often, of itself, a serious menace to life, and hence is considered by many of trivial moment, yet it is in reality a very pronounced and grave affection, both in regard to the patient's physical and mental health, and also, to some extent, as affecting the comfort and healthful surroundings of attendants and cohabitants.

It is only to those victims otherwise in good health that I shall refer especially in this paper, leaving such as result indirectly from pathological changes outside of the genito-urinary system, comprising general paralysis, effects of traumatism and other cerebral and spinal lesions, to the care of specialists of these departments.

Incontinence of urine, affecting male probably much oftener than female children, usually makes its appearance between the ages of two and three years, is sometimes self-limited, seeming to cease spontaneously in a larger proportion of cases about the approach of puberty, is a distressing and unsanitary malady, and an aggravation to all intercurrent diseases which afflict the child during this period of life. Not only this, but its tendency is to humiliate and debase these patients, to rob them of self-respect and confidence, to fill them with remorse, to engender deceitfulness and evasiveness, oftimes eventually manifesting its serious effects in a variety of neurotic symptoms, chorea, chlorosis and many other severe functional derangements.

The deleterious effects arising from the unhealthful environment of these little patients, caused by the saturation of wraps and bedding with the involuntarily discharged urine, together with the vaporization and inhalation of the same through each successive night for weeks, months and perhaps years, can hardly be overestimated, and must conduce to the generation and inception of other and more formidable derangements.

The two principal factors which operate to produce this state of things are: (1) Atony of the muscular mechanism at the neck of the bladder and (2) undue spasmodic contraction of the muscular walls of the body of this organ from some unnatural irritation, either external or internal. The former cause is often due to some constitutional defect, paralysis, degeneration of the lower spinal cord, involving the controlling reflex centers, anæmia, etc., all of which should be sought and cared for as paramount to local treatment.

The latter and more frequent cause named, finds excitation in any existing condition that tends to promote morbid and forcible contractions of the bladder from unnatural irritation by lithiasis, urinary concretions and acidity, and in fact anything of a foreign nature within this viscus.

Also, under this heading may be ascribed as indirect causes reflex irritation from preputial redundancy or stricture, phymosis, decomposing smegma about the corona glandis, urethral stricture and hypersensitiveness, chronic cystitis, adherent or diseased clitoris, disordered vaginal secretions, constipation, ascarides, wet wraps about the genitals, and sometimes an incapacious bladder.

All of these indirect influences so productive of this evil should not escape the vigilance of any and every physician who desires to make a definite diagnosis and to treat his patients intelligently and successfully. I have met some of these cases who report that the unconscious voidance of urine in bed occurred during a dream that the chamber vessel was being used in the usual way, thus indicating that there existed only a slight sensibility to the ordinary irritation upon the bladder by the contained urine, or that, from too profound sleep or from morbid or impaired reflexes, the response from natural pressure within the bladder did not serve to waken our patient.

TREATMENT.

Corporeal punishment is to be deprecated in all cases as not only an inefficient resort in overcoming or even palliating the difficulty, but also as positively harmful practically, conducing to physical and moral degradation by actuating our patients to misrepresentation and deceit, and should be earnestly condemned to all parents and guardians of such children.

Endeavors should be made to influence the minds of these little ones by wholesome advice against yielding to the practice, and by attempting, tenderly but persistently, to persuade them to greater efforts of their own to overcome the habit. I fail to comprehend the feasibility of striving to accustom the child to retain its urine for a longer period than usual in order to overcome the tension of the muscular walls, a course recommended by

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some good authorities; but, on the contrary, I am sure that much better results may be accomplished by providing facilities in the way of a chamber-vessel. I have treated children who had never heard of a receptacle being kept in a room for this purpose by any member of the family, which is quite wrong and unnatural, and an attendant for the purpose of having the patient rise at somewhat regular intervals during the night—for instance, at late bedtime, perhaps before the older members of the family retire, and again at early rising, to void its urine.

I have found that after practising this routine for a time they often continue it unaided from mere force of habit.

The method sometimes adopted for the purpose of preventing the child from assuming the dorsal position while asleep, to avoid dreaming, by the application of a bandage about the body with a knot at the back to disturb it should it attempt to turn, cannot meet with anything like universal approval, being practically worse than useless, for whenever applied tightly enough to be retained it is a source of constant irritation, and if loose it slips and becomes of no avail.

In those cases of preputial adhesion, they should be broken up, and where phymosis and a redundancy of tissue intervéne, circumcision is always indicated, caution being exercised to have the parts about the corona kept perfectly clean afterward.

In some female subjects the clitoris has been reported as bound down by adhesions which, having been overcome, speedy relief was experienced.

Ascarides, which, *per se*, produce decided irritation by invading the vagina, rectum and urethra, as well as perverting vaginal secretion, thereby indirectly contributing to the causes, should be subjected to the proper treatment. In chronic cystitis the bladder should be irrigated every second day with a hot antiseptic and alkaline solution, permanganate of potassium being one of the best remedies.

In two instances coming under my observation, one male and the other a female, I found marked improvement to follow mild but gradual dilatation of the urethra, which in each was very susceptible of irritation.

In one other case, that of a female whose bladder capacity was small, I succeeded in overcoming the difficulty by daily injections of warm sterilized solutions to the extent of toleration, until the viscus became distended to its normal condition.

The urine itself should always be analyzed, and if found charged with an excess of acids or phosphates, should be treated accordingly.

For hyperacidity, alkaline diuretics should be administered, particularly during the earlier part of the day. Tonic laxatives containing cascara and nux vomica are indicated in those cases of chronic constipation.

All secretions, especially those of the skin, lungs and bowels, are to be kept in an active state.

Special observance should be directed to the patient's diet.

Liquids are to be restricted during the afternoon, and practically prohibited after the evening meal, which, of itself, should be light.

Tea, coffee, spices and other stimulants must be interdicted at all times, and milk strictly forbidden in the evening, or within two or three hours of the child's time for retiring.

Something in the way of mitigating symptoms, if not of controlling them entirely, may be expected, in many cases at least, by the judicious administration of certain medicinal agents.

Strychnine, phosphorus, rhus aromatic and Fowler's solution do good where there exists a defective or morbid condition of the reflex centres of the cord.

The faradic current in this condition and other neuroses, applied daily for ten minutes at a sitting, by placing the positive electrode to the spine and the negative to the perineum or over the bladder, may serve of much avail.

Massage scientifically administered is claimed by votaries of that art to have accomplished wonders.

Chlorotic and anæmic patients should receive a generous and nutritious diet, and for them a protracted course of iron and arsenic, with other tonics, is to be prescribed.

If spinal irritation or hypersensitiveness be detected, the bromides, hyoscyamus, gelsemium, conium and sometimes chloral, are indicated.

Some mydriatic, in particular atropine, has been considered by many as almost a specific when vesical spasm from an irritable bladder has been the means of precipitating the discharge.

Hyoscine and even opium may be of some value in this particular variety.

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PLACENTA PRÆVIA WITH REPORT OF A CASE.

By S. W. Ranson, M. D.

Dodge Centre.

"The placenta is said to be prævia, whe it is attached to any portion of the lower uterine segment." Norris.

It occurs once in a thousand to twelve hundred cases.

It is most frequent in multipara between the ages of thirty and thirty-five, least frequent below the age of nineteen.

There are four varieties: central, partial, marginal and lateral.

The symptoms of placenta prævia are sudden hemorrhage, frequently profuse during the last months of pregnancy. It occurs earliest in the central variety, frequently as early as the sixth month, while in the marginal it is not apt to occur before the seventh or eighth month, and may not occur at all until labor supervenes.

Ballotment is absent, as the intervening placenta prevents the finger from feeling the presenting parts; when the os is sufficiently dilated to admit the finger and we can feel the irregular, lobulated placenta, our diagnosis is complete.

The cause of the hemorrhage, prior to labor, is due to the separation of the placenta, produced by the growth of the lower segment of the uterus, and changes in the os and cervix, at the time of labor, by dilation of the os and uterine contractions.

The indications of treatment are first, to control excessive hemorrhage, second, to expedite the labor as fast as consistent with safety to mother and child.

Our agents to meet these indications I would limit to the tampon, separation of placenta, and extraction before the child, forced delivery by forceps or version.

We should not forget that if head or breach present, and the pains are sufficiently active to bring the presenting parts down, and thereby control hemorrhage, we can safely leave the case to nature, as long as it progresses satisfactorily.

On March 13 last, Dr. Way, of Claremont, sent an urgent message for me to meet him at once, to assist with a case of placenta prævia. There had been a sudden and alarming hemorrhage a few hours previous, but it had subsided. Examination showed the rugous spongy placenta over the os, ballotment failed to reveal presenting portion of fœtus; the patient was a primipara only seventeen years of age. Pelvic diameter were normal.

Dr. Way remained at the house over night, and watched the case closely for several days. April 8, I was again called, and learned that her medical attendant was absent, to be gone for several days. Labor pains had begun a few hours previous, and with them severe hemorrhage. Syncope had occurred several times before my arrival, she had weak, rapid pulse, os dilated to size of silver dollar, pains irregular and feeble, could not make out presentation.

I tamponed the vagina, and sent for professional assistance, but none came; several hours had passed since my arrival, and the time had arrived when active treatment must be begun. I adminstered chloroform, removed the vaginal tampon, found the placenta thinnest on the right side, separated it from one-half the circumference of the os, ruptured the membrane intending to bring down a foot, and tampon the os with the breech; this induced a vigorous pain, which brought the head to the superior straight of the pelvis, plugging the os and checking hemorrhage. In the interval between the pains, I grasped the uterus after Credé's method for the expulsion of the placenta, maintaining the head as an efficient tampon against further hemorrhage. When the head had descended well into superior straight of the pelvis, I left the case almost wholly to nature, the pains though feeble causing fair progress until the head rested on the perineum, when there was considerable delay. When the head was finally delivered, I found the cord so tightly drawn around the neck of the child as to stop all pulsation. I was unable to bring down any slack and was compelled to cut the cord before the child could be delivered. All efforts at resuscitation of the child were futile. Moderate hemorrhage followed delivery. After waiting about one-half hour for the expulsion of placenta, I introduced my hand and found it adherent to the left lateral wall of the lower half of the uterus. I separated it with some difficulty, causing some hemorrhage, which ceased with expulsion of the placenta.

Our patient had lost a large amount of blood, her pulse was feeble and rapid, her face and lips pallid; I administered restoratives, kept her in a horizontal position, with the foot of the bed elevated several inches, and had the satisfaction of seeing her rally rapidly.

There are a few things a little unusual in this case: First, she was a primapara at the early age of seventeen years. Second, had it not been for the short cord, which may occur in any case, we should without doubt have delivered a viable child.

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PATHOLOGICAL NOTES ON ECTOPIC GESTATION, WITH REPORT OF TWO CASES.

By John H. Rishmiller, M. D.

Minneapolis.

There are many cogent reasons why physicians keep silent about their operative fatalities. We are all fully aware that a surgeon who operates meets occasionally with fatal results, and we know that a surgeon who reports a number of successful cases must have had deaths also. Everybody can make statistics, but these would be of more value if operators would report and confess their shortcomings, as unhesitatingly their unfavorable as their favorable cases. The knowledge we acquire through unfortunate experiences is the most valuable for the broad and practical observer, and I wish to enter a plea for a more arduous study of the unfavorable cases rather than of the favorable. It is my design to report two cases of extrauterine gestation, with notes relative to their gross pathology, where one died three hours after the operation from shock, and the other thirty-six hours after from acute septic peritonitis. Both cases came under my care and observation while House Surgeon at the Woman's Hospital, New York City, in Dr. Hanks' service, who was operator in both instances, and by whose permission I present them for consideration.

Mrs. S., admitted February 12, 1894. Aged thirty-eight years. Married twenty-one years; two children, twenty and seventeen years old. She had a miscarriage nine years ago. Her last menstruation had been four months ago. Present illness dates back four months, when she thought she had become pregnant; while walking one day developed sudden pains in the hypogastric and iliac regions. These paroxysmal pains had recurred daily, lasting about four hours, and leaving her in a very weak condition. She had been troubled with nausea, anorexia and constipation, with occasional paroxysms of syncope and dyspnœa.

On examination the abdomen was found enlarged and very tender on the slightest palpation. Percussion gave a tympanitic resonance in the left iliac region, extending to the median line. Vaginal secretion was abnormally increased. 7 A. M., temperature, 101°; pulse, 108; respiration, 26. 10 P. M., temperature, 102.8°; pulse, 112; respiration, 28. Urinalysis: Alkaline; Sp. G. 1007. Trace of albumen. Renal epithelium, hyaline and slightly granular casts. On bimanual examination a circumscribed mass was detected in Douglas' cul de sac, more to the left, and pushing the uterus high up and anteriorly. Diagnosis: Extrauterine pregnancy. Dr. Cleveland, in consultation, on examination found a mass in Douglas' pouch, and advised immediate cœliotomy.

February 13. Patient etherized, condition extremely poor, and prognosis unfavorable. A mesial abdominal incision was made of about five inches, opening directly into the much distended sac, which contained a putrescent fœtus of about four months, placenta, blood clots, etc. On opening the gestation cystoma offensive gas escaped, formed from the decomposition of the fœtal débris. This cyst seemingly was formed by the left broad ligament, and, consequently, subperitoneal. After removing the fœtal detritus, especially the placenta, considerable oozing was detected, which was promptly checked by hot sponges and cat gut ligatures. At this point the peritoneal cavity was accidentally opened. The cavity was flushed out with hot sterilized water (temperature 110°). Counter drainage was established through the vagina, using iodoform gauze; the cavity was then thoroughly tamponed, and some of the gauze strips were brought through the lower abdominal wound, thus establishing thorough drainage. Abdominal incision partly closed. The patient received brandy hypodermically during the operation, and a stimulating enema before leaving the table. Pulse very feeble, intermittent and rapid (140). The patient rallied slightly, but died of shock three hours after the operation.

The following suggestions may permissibly be offered: The fœtus had advanced to about four months and was found macerated and decomposed, showing that a considerable interval had elapsed between the death of the fœtus and its extraction from the abdominal cavity. Now recall the data: She developed inexplicable pains four months before the operation, and the condition and age of the fœtal detritus were such that it is unimpeachable to surmise that the gestation had commenced eight months prior to the operation, and had advanced four months, when we receive the history of unaccountable paroxysms of pain and evident rupture of the Fallopian tube, followed by escape of the fœtus between the folds of the broad ligament. The gestation cyst was so extensively enlarged from the products of decomposition and the generation of putrescent gases that it was universally adherent to the abdominal viscera and parietes, and I believe I am warranted in making the assertion that this patient carried a dead fœtus in her abdomen for about four months. This case menstruated regularly up to the time when she de-

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veloped the severe pains, but frequently we have this catamenial regularity in ectopic fœtation without casting any light on the actual condition. The shock was very profound, being undoubtedly produced by the hyperirritation of the septic virus on the solar and minor plexus.

Mrs. F., aged twenty-nine, admitted June 11, 1894; married eleven years; one child eight years old. Her catamenia had been rather profuse, lasting six to eight days, and returning every three weeks. The last menstruation had been on September 26, less in amount than usual, and four weeks between the periods. Last December the patient had an attack of syncope and cramps which recurred every two to three hours for several days, followed by an attack of peritonitis, confining her to bed for five weeks. Last April she had expelled a decidual cast which had been followed by profuse hemorrhage for three days. Two weeks ago she had an attack of local peritonitis. Her physician called Drs. Hanks and T. G. Thomas in consultation who unhesitatingly agreed upon ruptured extrauterine gestation, with the fœtus dead for some time, and advised her to enter the Woman's Hospital immediately and have an operation performed. The uterine sound passed in four inches, and per vaginam the uterus could be mapped out, which was pushed to the left by a large mass on the right. The tumor crowded the pelvic space. Her temperature varied from normal in the morning to 102° F. in the evening.

June 12. Chloroform narcosis. Median incision disclosed the cystoma on the right side, apparently subperitoneal with fluctuation. This fluid was aspirated, which proved to be purulent and bloody. There was no pedicle and the gestation had evidently started in the right tube, and after rupture (probably in the third month) had subsequently developed to a great extent between the folds of the broad ligament. The sac was then opened and contents (fœtus, blood clots, placenta, etc.) removed. The hemorrhage which ensued from the placental implantation was promptly checked by hot irrigation and tamponing with gauze. A vaginal perforation into Douglas' pouch was performed and several strips of iodoform gauze were carried through this opening for drainage. The fruit sac was three times irrigated with sterilized water and then tamponed with gauze, which was carried through the lower abdominal opening. The upper part of the abdominal wound was closed and dry dressing applied. Time of operation, forty-five minutes. The patient was returned in a very precarious condition and her temperature immediately commenced rising, and she died thirty-six hours afterwards of acute septic peritonitis. The fœtus weighed twelve ounces and measured ten inches in length. It had fine hair upon its head. The nails were half way down the finger tips and the fœtus was evidently well advanced in the sixth month. There was absolutely no fat in the cellular tissue, and, in fact, very little more left than skin and bones.

Both cases had marked prodromata of sepsis, and had escaped surgical aid until the prognosis was very little in their favor. As we approach the term the therapeusis becomes more hazardous. Some authorities advocate indefinite expectant treatment (after the child has died), but the mortality does not warrant such a procedure, since purposely delayed surgical interference may often be thwarted by intercurrent sepsis and peritonitis, while previously an operation could have been undertaken under the most favorable conditions. Both the embryonic and fœtal periods are attended with formidable dangers: hemorrhage in the first, from tubal rupture; peritonitis and sepsis in the second. We fear hemorrhage from operation most in advanced pregnancy where the child is alive or but recently dead, and one operator encountered alarming hemorrhage in removing the placenta three months after the fœtus had died. In the main we expect the cessation of the placental circulation two months after the fœtus has died. The few cases of spontaneous recovery do not justify temporizing, and in view of the innumerable accidents we should always be vigilant, and regard it as we would a malignant neoplasm.

Some confusion has arisen as regards the classification of extrauterine fœtation. In my estimation it makes very little difference where we find the fœtus or the implantation of the placenta. If tubal abortion has taken place during the first two months, i. e., prior to the formation of a placenta, it may be inferred by the casual observer to be abdominal, but I fail to comprehend how advocates of primary abdominal fœtation can substantiate their syllogism if we study the subject microscopically, and detect muscular and connective tissue fibres in the sac walls, which we always do. Furthermore, it is useless to prate that muscular fibres can develop from the pavement epithelium of the peritoneum, but reasonable to assume that originally the gestation started in the Fallopian tube, and received its muscular fibres from that source, and afterwards tubal abortion subsequently developed in the abdominal cavity. The tubal contents always tend to move in the direction which presents the least resistance. Fallopian tube gestation may be destroyed, first, by the fœtus gradually passing, as development progresses, out through the ostium abdominale, producing a tubal abortion, and, second, by the formation of a hæmato-salpinx, where we have hemorrhage producing a continuous pressure and ultimate death, or where the extravasated blood undergoes decomposition, the life of the ovum may be terminated by the development of a pyo-salpinx. The placental circulation is interferred with by the contractions of the cyst walls, and, as the placenta separates, by blood filling the space of separation. The latter has a further tendency of tearing the

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placenta from its attachments. Extravasation of blood into and displacement of the placenta seriously interferes with the anabolic changes of the fœtus, which may result in death, and, with the entrance of noxious matter from the alvine canal, final suppuration. The rule is, the remoter the fruit sac from the lower alimentary canal the healthier the fœtus. The fœtus always dies at full term, which is accompanied by spurious labor, and usually by the shedding of a decidual cast. The latter is indicative that the fœtus has died, or that its life is threatened. The direct cause of death is possibly an interference with the maternal placental circulation, causing asphyxiation of the child. This is corroborated by the vigorous movements (convulsions) of the child just preceding death. The fate of the fœtus after its escape into the peritoneal cavity depends somewhat on its age. If young it may be removed by the absorptive power of the peritoneum, but if more matured it becomes encapsulated by a pseudo-membranous sac; or the fœtus may be turned into a lithopædion, into adipocere, or it may undergo suppurative degeneration.

The invariably constant peritonitis is of a chronic character, producing adhesions between the gestation sac and surrounding structures. The tumor may press upon the rectum and bladder, producing difficult defæcation or almost complete obstruction in the former and frequent dysuria or incontinence in the latter. The pressure of the cystoma on the rectum or constrictive adhesive bands involving the lower intestinal lumen may be a cause for an irritative diarrhœa. If the case has advanced to an abscess formation the patient may withstand the suppurative onslaught after years of suffering, and ultimately the fœtal débris may escape through the rectum, vagina, bladder or abdominal walls. Again, the patient may succumb from sepsis after rigor, hyperpyrexia with a hectic quality, feeble and inappreciable pulse, exhaustion, delirium and coma.

For the first two months the walls of the tube thicken as the ovum enlarges; more by vascularization than by muscular hypertrophy and hyperplasia, but some increase is attributable to inflammatory exudation, both in the walls and enveloping peritoneum of the tube. The cause of rupture is due to a mural thinning of the tube produced progressively as the ovum enlarges. Frequently the place of placental attachment may become so mushy through vascularity that this point presents the least resistance to bursting. Abdominal gestation is always secondary to rupture of a tubal pregnancy. The earlier the rupture the less danger to the mother, as the torn vessels are then small and more liable to control the hemorrhage by the contraction of their muscular walls. Statistics go to demonstrate that rupture is rare in the first and rarer after the fourth month, but most frequent in the second month.

Rupture may take place, first, into the peritoneal cavity, *i. e.*, through the portion of the tube covered by peritoneum, and, second, into the broad ligament, *i e.*, through the attached portion of the tube. This attached portion is the weakest on account of the absence of a peritoneal covering, and as the tube is bulged out by the ovum the layers of the mesosalpinx separate, and by gradual thinning and stretching, the ovum works its way through the lower part of the tube and finally may be found between the layers of the broad ligament. The ovum usually ruptures with the tube, but is not so easily ruptured in the subperitoneal as in the abdominal variety, as the surfaces of the broad ligament limit expansion. In extraperitoneal rupture the ovum comes into intimate relation with the bowel, especially the rectum, and particularly when on the left side, and as a consequence abscess formation is a frequent source of annoyance in this variety. Suppuration outside of the extraperitoneal variety is extremely rare. Authors claim that the peritoneal variety of rupture is the one most frequently encountered. This I vouchsafe, but I do claim that the subperitoneal variety is the most frequently ruptured, moreover not the most frequently diagnosed and observed, as a large percentage are passed over inadvertently as some obscure pain in the side, and ultimately the physician timidly makes an examination and detects a cystoma of some nature in the broad ligament and he is at sea to provide a name for it. Dubiously it is termed a pyo salpinx, the diagnosis of which cannot be contradicted by the most experienced diagnostician, but frequently it is a delusion and a snare and nothing more than a decomposed embryo encapsulated by a pyogenic membrane.

Dayton Building.

REPORT OF A CASE OF SYMPHYSEOTOMY.

By W. S. Fullerton, M. D.

Duluth.

Symphyseotomy is one of the surgical operations for the overcoming of obstacles to delivery resulting from certain forms of contracted pelvis. It is not a new operation but it is now having a period of revival which promises to give it a fixed position. It seems curious to me that it has not been more in vogue in the past, for of the three surgical measures adopted in these cases I think this far above the others in offering the best chance for the life of both mother and child. It is an operation which preëminently belongs to the

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field of the general practitioner. It is not, and from the nature of circumstances surrounding obstetrical practice it cannot be, delegated to the specialist. I therefore hold it to be a matter of the utmost importance that each and every case where this operation is resorted to, be reported in its entirety.

Acting upon this belief, I have requested permission from Dr. C. A. Stewart, of Duluth, to report to you the following which occurred in his practice and in which it was my privilege to assist him:

On April 15, 1894, he was summoned to attend Mrs. J. P., a primapara twenty-five years of age. He had had no previous opportunity to examine the patient and found himself confronted with a labor complicated by a contracted pelvis. Normal delivery was impossible, and he made a forceps application with the head engaged at the brim and finally succeeded in dragging it through. The child died within forty-eight hours. The mother recovered and in due course of time became pregnant again. He was called to attend her in her second confinement on February 24, 1896. In the meantime he had made a careful examination of this patient and found what is known as the Naegele oblique pelvis, the obliquity being on the right side. The cause of this deformity was an attack of hip joint disease at the age of ten years, which passed through the various stages of inflammation and resulted in anchylosis of the left hip joint.

After her general health had improved sufficiently for her to go about she began to use crutches, and depended upon them until she attained adult growth, when they were discarded for the high heeled shoe with thick sole.

He had previously determined upon symphyseotomy in this case, and accordingly when the head had reached a position at which there was no further progress, it being well engaged in the superior strait, we proceeded to operate. She was thoroughly anæsthetized with chloroform and placed crosswise of the bed with the hips drawn well to the edge, the buttocks resting upon a couple of table leaves placed on the mattress. The bladder was emptied by catheter and a sound passed into it and left remaining there under control of the assistant. The labia were separated till that portion of the pudendum between the mouth of the urethra and the clitoris was well exposed. An incision large enough to admit the forefinger was made on the side of the median line corresponding to the sound leg beginning just below the clitoris and running in a slightly oblique direction downward and outward. Through this the finger easily reached and felt the symphysis. Under its guidance a strong, thick-backed, blunt pointed resection knife was passed and its cutting edge entered at the point of cartilaginous union. This was severed about half way through from the upper side. The knife was then withdrawn sufficiently to allow it to be entered on the under side and the severance completed by cutting upward and outward.

The thick back of the knife appears to me to be an important element of safety against suddenly slipping through the cartilage and wounding parts beyond. All the steps of the operation, it is needless to say, were done under as perfect aseptic condition as possible.

Upon the complete severance of the symphysis the rami separated so that the breadth of the forefinger passed readily between them, and delivery of a living child was completed by forceps without difficulty, the assistant supporting the sides of the pelvis.

The forefinger of the operator was again placed in the wound till it felt the point of separation at the symphysis. The assistant then forcibly drew together the rami with a four inch strip of adhesive plaster till the tell tale finger felt the approximation to be perfect, when the plaster was fastened and reinforced by a few well applied turns of roller bandage. The wound in the vulva was next closed with a continuous catgut suture and the patient was comfortably disposed in bed. The only after-treatment necessary was a firm strap around the pelvis below the crests of the ilia.

The recovery was uninterupted and is perfect. In five weeks from date of delivery the patient was able to walk with a cane and at the present time has regained her usual freedom of locomotion. Furthermore, she has what she has earnestly longed for, a living child.

Now, in closing, I wish to define my position regarding this operation and to emphasize some of the strong points by recapitulation. "One swallow does not make a summer," neither is one successful case of any form of operation sufficient to establish its claims, but I am convinced from this case just reported that in certain conditions symphyseotomy is the operation par excellence.

I am positive that in this case the mother was subjected to infinitely less risk than she would have been had version been resorted to with the possibility of a craniotomy or at least a forceps delivery of the after coming head. I do not wish to convey the idea to any member of this Society that this is a simple performance to be used under much the same conditions as the forceps. It must not be looked upon in any such way. It is the operation of election in cases which present the alternative of early induced labor, craniotomy, Cæsarian section, or doubtful success from version, and in such cases I believe it the duty of the obstetrician to adopt it in preference to the others, because by so doing he gives the best possible chance of life to both mother and child.

The operator in this case, Dr. Stewart, informed me that at the time he supposed this operation original with him, but in the March number of the *American Gynæcological and Obstetrical Journal*,

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under the head of Transactions of the New York Obstetrical Society, stated meeting of December 17, 1895, appears a description of the operation by Dr. A. E. Ayres, who claims to have originated it in December, 1893, but as my report of this case is not made for the purpose of claiming priority for anyone, that question may be dismissed without further notice.

Symphyseotomy having been decided upon in a case this method presents over the ordinary operation with large external wound all the advantages that a subcutaneous tenotomy does over the open method. The points in the technique of the operation which I wish to emphasize are that it must be done aseptically, for asepsis is more feasible here than on first thought it seems to be, that for safety, the thick-backed, round-pointed knife is preferable, and for the same reason I would recommend that the division be begun from above and finished from below by cutting upward and outward, that it is important to empty the bladder before and keep a sound in the urethra while operating, that the rami should be approximated under the guidance of the finger in the wound, and finally that the wound should be closed by suture and not packed with gauze.

THE MANAGEMENT OF DIPHTHERIA.

By A. B. Stewart, M. D.

Owatonna.

Probably in the last two years, or since antitoxin has been placed on the market, no subject has been more often brought before the physician in his medical journals, brochures, and even in the daily press than that of diphtheria.

I offer no apology today for bringing the subject before this Society, for while the disease stands fourth in the mortality list, and claims a sacrifice of eight hundred victims a year in our own state, the subject can never become worn out or threadbare. It is one of the most dreaded, one of the most treacherous, one of the most fatal and one of the most common diseases of childhood. The general practitioner cannot ease his work or his mind by turning the case over to a specialist, or by sending it to a well appointed hospital, but must meet the conditions with the best there is in him.

In this paper I wish to report the management of a few cases of diphtheria at the State Public School for Dependent and Neglected Children, at Owatonna. The school is situated on an elevation overlooking the city, and has an administration building, engine house, water tower, electric works and laundry, school house, hospital, detention cottage or quarantine hospital and six cottages. There is an abundant supply of pure water, the plumbing and sewerage are perfect, and there are no dark or damp cellars. The school is of the cottage plan, having an average of one hundred and seventy-five children between one and seventeen years of age.

The school was opened for the reception of children in December, 1886. Diphtheria appeared first in October, 1888. In the summer of 1889 it again appeared, and continued with occasional cases into the winter of 1890, one death occurring in July, and one in December, 1889, and one in January, 1890. During two years ending July 31, 1890, there were fourteen cases. In June, 1891, there were two or three cases with one death, and again in January, 1892, there were two or three more cases with one death. During the remainder of 1892, and up to August, 1893, there were no cases. The above history I obtained from the school. From August 1, 1893, to October 1, 1895, there occurred under my own observation forty-four cases of diphtheria and two hundred and twenty cases of tonsillitis, with two deaths.

I mention these cases of tonsillitis because I know that it is absolutely impossible, in the beginning of many cases, to make a differential diagnosis between diphtheria and tonsillitis without a bacteriological examination. I also believe that tonsillitis is infectious and should be isolated.

In the school, upon the first symptom of any sickness, the child is sent to the hospital and the throat generally inspected by the nurse, and under all circumstances, when a young child comes in with a history of a loss of appetite, fever and restlessness, with or without vomiting, the examination is imperative; for in many cases sore throat is not complained of by a child with beginning diphtheria, even after an examination of the fauces may give valuable information. If the fauces are reddened and the tonsils swollen, the child is isolated and treatment begun. This is wise, because if the disease is tonsillitis the treatment is good; if diphtheria, the treatment is still better. The child is given one full dose of mild chloride, or several divided doses at half hour intervals, and put upon a mixture of tincture of chloride of iron and glycerine. The local treatment, which is very important, consists in thoroughly cleansing the throat and nose, using an atomizer with peroxide of hydrogen, full strength or diluted, or in a few cases in which the peroxide seemed to irritate, carbolic acid with lime water, two and a half grains to the ounce, was used.

In a few cases, when two or three children were necessarily crowded into one room, we kept on an oil-stove a basin of water containing a few drachms of a mixture of acid carbolic 1 ounce, oil eucalyp-

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tus 3 ounces, and spirits turpentine 8 ounces, but no such steam or spray or disinfectant can take the place of fresh air and sunshine. Each patient was encouraged to take proper nourishment, of which probably nothing is better than good milk, given at regular intervals, supplemented by alcoholic stimulants when necessary.

In so exhausting a disease as diphtheria any treatment which has to be forced upon a child will do harm, but an intelligent and sympathetic nurse, and no other should be tolerated with children, can usually gain their confidence and carry out the proper treatment.

Antitoxin was used in two cases. In the first case, a boy of twelve, I believe that a life was saved by its use. The other case was severe from the beginning, the serum was used rather late, and seemed to have no effect. The disease extended to the posterior nares and nose, nasal hemorrhage was so severe as to require plugging to control it, the stomach would retain neither food nor medicine, and there was nephritis with complete suppression of urine. The case in no way influenced my opinion of antitoxin.

Other symptomatic treatment was occasionally used when indicated. When the child was to be removed from quarantine it was given a full hot bath with plenty of soap, with especial attention given to the hair, after which it was sponged with a bichloride solution of 1-2000.

Bedding and articles that could be were thoroughly boiled, others washed in a bichloride solution. The room was filled with steam, fumigated with sulphur (2 lbs. to 100 sq. ft.), washed with a bichloride solution and thoroughly aired.

How long after recovery before quarantine shall be removed is not to be measured by a certain number of days or weeks, but each case should be decided by itself. In some cases contagion ceases soon after the membrane disappears, in others it is very much prolonged. When the throat rapidly regains its normal condition and the nasal cavities are free, with no discharge, a week is sufficient. In other cases, even after the throat has cleared, there is still a discharge from the nose, perhaps from one nostril. In such cases the contagion can probably be communicated by the nasal discharge, and the child should be isolated until the discharge is cured or a bacteriological examination proves it harmless.

Many of the cases were treated in one small hospital, with other sick children, and much of the time with but one nurse in attendance, and on several occasions with three and four cases in one room. Under these circumstances it is worthy of especial emphasis that not one case of diphtheria or tonsillitis was contracted in the hospital.

In a paper on the prevention of diphtheria and scarlet fever, read by J. Lewis Smith, in 1892, he states that Granger, of Paris, had charge of wards for diphtheria into which, during a number of years, a large number of children were admitted who had not diphtheria, yet none of them contracted the disease. The precautions taken by him consisted in surrounding the bed by a metallic screen.

These cases of diphtheria have occurred in groups at different times, and in each outbreak the first case was usually a new arrival. Such an observation would lead one to suppose that the infection was brought in each new outbreak by children coming from communities in which the disease prevailed. This was true in some cases, but I believe not in all. The more I study the subject the more firmly am I convinced that the disease can be communicated by an apparently healthy individual. I came to the conclusion that a child in the school who had never had the disease might be able to carry the infection to a new arrival with whom he came in contact, and still not have the disease himself.

This idea was new to me, but later I found that I was in good company, for upon obtaining a volume upon pediatrics by Roach, of Harvard, about the first thing that I read was: "There is no true diphtheria where the Klebs Loeffler bacillus is not present, but its presence in a healthy throat does not constitute the disease diphtheria, although the individual may be the source of infection to others." Later, in a paper read before the New York Medical Association by Dr. W. H. Park, of New York county, on recent studies in diphtheria and psuedo diphtheria, I found the following statement: "Virulent bacilli had been known to exist in the throats of healthy persons who had been attending cases of diphtheria, so it was evident that such persons could convey the disease to others without, perhaps, themselves becoming ill."

Through the kindness of Dr. Bassett, who is now resident physician of the school, I am enabled to add the following to this report: Between October 1, 1895, and May 1, 1896, there were seventeen cases of tonsillitis and ten of diphtheria, with no deaths. These cases were all verified by a bacteriological examination. During February, March and April twenty-four children were inoculated with immunizing serum, Behring's No. 1 being used with a few exceptions; three of these children had diphtheria later, one in twelve days, one in fifteen days, and one in twenty days after inoculation.

I wish to emphasize the importance of knowing the condition of the throat in the young, as it is involved in many of the diseases of childhood. In the early stages of these diseases certain common conditions are discovered, which only gradually assume various typical forms. On the first visit to a sick child the examination should not be considered complete until the throat has been inspected. When a suspicious deviation from a healthy appearance is observed, isolate, as one cannot be sure what kind of a "sore throat" it will

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prove to be. Usually, when a case can be positively diagnosed at first sight as diphtheria, valuable time for the welfare of the patient and the protection of others has been lost.

Always bear in mind the possibility of infection being carried by the apparently healthy. With early diagnosis, entire isolation and proper treatment the mortality from diphtheria can be greatly lessened.

NOTES AND COMMENTS UPON THE DISCUSSION OF THE ANTITOXIN TREATMENT OF DIPHTHERIA AT THE LATE MEETING OF THE AMERICAN MEDICAL ASSOCIATION, AT ATLANTA, GA.

By C. G. Slagle, M. D.

Minneapolis.

Mr. Chairman, Ladies and Gentlemen:

As indicating the hold which the late serotherapy has taken upon the medical profession, we have but to observe the prominence given that subject before the American Medical Association at Atlanta, Ga., where two sections of the Society devoted an entire day, May 6, 1896, to its discussion. Before the Section of Materia Medica, Therapeutics and Pharmacy, Dr. F. E. Stewart, of Detroit, chairman, there were presented near a dozen able papers and reports upon this subject, viewed both from a scientific and medical standpoint, and the discussion was entered into with much zeal by as many more eminent medical men from various parts of this country.

It was not my good fortune, however, to be present at that Section during the discussion, from the fact that the Pædiatric Section, in which I was most interested, Dr. Cotton, of Chicago, chairman, was discussing the same subject at the same time, more especially the antitoxin treatment of diphtheria, and it is to that discussion as it occurred under my observation that I purpose offering you a few notes and comments at this time. Not only were there a number of able papers prepared for the occasion on the subject, but the discussion impromptu was entered into with much interest by several eminent pædiatrists and scientists well qualified to discuss it both from a scientific and medical standpoint. The principal papers, as you may have seen from the programme, were as follows:

1. "An Experience with Antitoxin, with Instructive Results," by W. Strickler, of Orange, N. J.
2. "The Fallacy of Antitoxin as a Cure for Diphtheria," by Elmer Lee, of Chicago.
3. "Some Practical Points on the Effect of Antitoxin and Intubation, with Especial Reference to Infant Feeding in Malignant Diphtheria," by Louis Fischer, of New York.
4. "Diphtheritic Laryngitis," by A. Campbell White, of New York City.

These, I say, were the principal papers before the Pædiatric Section, and bear with them, you perceive, names of authors of well-known ability in his especial field.

The discussion of the papers was opened by Prof. Klebs, late of Zurich, whose name has become famous, especially as one of the discoverers of the Klebs Loeffler bacillus of diphtheria.

We regretted that his broken English was not better, but it was sufficiently good to be fairly well understood by those who followed him closely in his most interesting discussion of tuberculin, antitoxin and the Klebs Loeffler bacillus.

He was followed by a number of able men, notably Prof. Larribee, of Louisville, Casselberry, of Chicago, Parks, of Atlanta, Jewett, of Brooklyn, and others.

The consensus of opinion was positively in favor of the virtue of antitoxin in the treatment of diphtheria, with the sole exception of Dr. Lee, who denounced it in strong terms as being unphysiological, unscientific and dangerous, and only another of the many medical fads, destined soon to be exploded and shelved with tuberculin, the antirabic serum, etc. While his paper expressed sentiments strongly in contrast with the experiences and opinions of able men and scientists present, his evident candor, ability and courage seemed to shield him to a great extent from the sharp shafts of criticism that were expected, by some of us, at least, from such men as Prof. Klebs and others present. The Professor only shrugged his ample shoulders, shook his head occasionally, and looked an earnest though courteous disapproval at the earnest author of the paper.

But in regard to Dr. Lee's sweeping denunciation of the employment of the Pasteur antirabic serum to immunize against hydrophobia, there were evidently some present in perfect accord with his expressed views; at least of *one* I am sure—my humble self.

Dr. Louis Fischer, of New York, expressed a very favorable opinion of antitoxin in the treatment especially of malignant and laryngo tracheal diphtheria, and also expressed a strong preference for intubation instead of tracheotomy in very young children (infants), and insisted on employing rectal alimentation while using the tube, also assuring us from statistics that by the employment of the antitoxin in these cases, the period necessary to retain the tube was much shortened.

The principal points insisted upon by most of those who engaged in the discussion, either by paper or extempore, were about as follows:

First. Antitoxin is a positive and reliable therapeutic agent in the treatment of all forms and stages of diphtheria, but should be employed as

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early as possible in bad cases, and always *carefully*, *i. e.*, antiseptically.

Second. It should not be relied upon, however, as a *specific*, to the exclusion of other well-tried medical, surgical and hygienic methods, either local or systemic.

Third. Opinion was about equally divided as to the propriety or advisability of employing it as a prophylactic or preventative; in those healthy children only exposed to and not yet affected with the disease, in other words to immunize the healthy, Prof. Klebs and some others opposing such employment of it.

I may remark here that the late unfortunate experience of Dr. Longerhaus in the sudden death of his own child (in health) only a few minutes after the injection of Behring's serum (antitoxin) will probably deter many more from employing it as a prophylactic in those healthy children who have only been exposed to diphtheria, as it seems quite possible for such a potent agent to be more dangerous to introduce into a healthy child than it would be in one already poisoned by the contagion of diphtheria, and this point was especially emphasized by some of the speakers in the discussion.

The fourth proposition was that antitoxin is reasonably harmless when employed properly, and carefully selected as to purity and reliability.

Fifth. The evidence at present of experienced and capable men all over the world is overwhelmingly in favor of its employment in every severe case where the diagnosis is unequivocal.

Statistics everywhere showing a greatly reduced mortality where it has been employed, and especially emphasizing its efficacy in that dreadfully fatal form, laryngo tracheal diphtheria, where it has generally reduced the mortality from 75 or 80 per cent. to 25 or 30 per cent., much less often demanded either intubation or tracheotomy.

Sixth and lastly. The presence of the Klebs-Loeffler bacillus is the only positive ground for definite diagnosis in diphtheria; but that in many cases the clinical symptoms are sufficiently plain to enable an experienced physician to render a satisfactory diagnosis.

Many interesting and seemingly convincing statistics were presented to the Section in regard to the antitoxin treatment of diphtheria, and coming as they did from every part of the country and from men of undoubted candor and ability, would certainly seem to justify the conclusion that in this new agent we have indeed a very important and reliable remedy for that dreadful scourge, diphtheria, the opinion of a few men like Dr. Lee to the contrary notwithstanding.

307 Plymouth Ave.

DISCUSSION.

The paper entitled

THE MANAGEMENT OF DIPHTHERIA,

by A. B. STEWART, M. D, of Owatonna, and Dr. SLAGLE'S paper on

THE DISCUSSION OF THE ANTITOXIN TREATMENT OF DIPHTHERIA BEFORE THE PÆDIATRIC SECTION OF THE A. M. ASSOCIATION, ATLANTA, GA., MAY 5 TO 8, 1896,

were discussed as follows:

Dr. SLAGLE: I want to put myself on record in this Society, that after as thorough an investiga- as I have been able to make, that the Pasteur antirabic treatment of hydrophobia is one of the most stupendous scientific errors we have ever encountered, and I want that to go on record as my expression, so that when I am dead and gone (I do not expect to live a great many years) there may be something standing on the records of this Society showing my attitude on this subject.

Dr. DAVIS: These two papers are now open for discussion, and any member is at liberty to speak.

Dr. WALLING: I am sorry I was not in at the commencement of Dr. STEWART'S paper. While I have not had many cases of diphtheria—only two cases in the last three years—I have been very much interested in this disease, especially when it becomes malignant, and, as you all know, I have taken an active part in the preparation of statistics regarding the treatment of this disease, as I would like to know, with all the rest of you, something that is a specific for this terrible disease of diphtheria.

Dr. DAVIS: Does any one else wish to discuss these papers?

Dr. BROWN: I simply want to say that I am in full sympathy with Dr. STEWART. It is a difficult matter to diagnose between tonsillitis and diphtheria, and I have seen a good many cases, and I see cases now in which I have not much confidence in my diagnosis. I believe every man who has as much confidence in his ability to make a diagnosis as my friend Dr. SLAGLE will sometimes make a mistake. I think we want to be very much on our guard. There are some cases of mild diphtheria which can with very great difficulty, even with a bacteriological diagnosis, be distinguished from cases of tonsillitis.

Dr. S. W. RANSON'S paper on

PLACENTA PRÆVIA, WITH REPORT OF CASE,

was discussed as follows:

Dr. DAVIS: This paper is now open for discussion. It is the last one we have on the program, unless Dr. FULLERTON is present.

Dr. WALLING: I have just had one case of placenta prævia, and I considered that a very interesting case. The lady called on me in the fall of

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last year, complaining of a severe hemorrhage. She was a German lady, very ignorant, and I at once suspected from what she said that she had a case of placenta prævia below the centre of the uterus, and told her so. I advised her to keep as quiet as possible, and she lay down on the couch until she had a chance to go home and take care of herself. I think she did as well as she could under the circumstances. But three or four times after that she had attacks of hemorrhage, and I was called in to look after her. It was impossible to keep her from overworking. In January the labor came on, and if I had been called when it first came on it would have been all right. She had a woman there who knew more than I did, and she said I did not know anything, and if she would let herself alone she would be all right. It was about four hours after labor began that I got there; it was a distance of about eight miles in the country. I made an examination then as I had done before, and I found the placenta down very near the os, and the hemorrhage was very profuse, pulse feeble, and the woman was rapidly getting into an alarming condition. I had chloroform, which I use in cases of that kind, with me, and I gave her chloroform. I gave it to the woman who was present and told her how to use it, and she accepted the trust with a great deal of trepidation, but she did very well. I introduced my hand and brought on the delivery immediately. I think the woman would have died in less than half an hour if she had not been delivered very rapidly. The hemorrhage continued until the child was delivered and the uterus was contracted. The case for five days progressed in quite an alarming manner; the woman was evidently suffering from sepsis to some extent, and from exhaustion brought about by the hemorrhage, but after that she began to gain, and at the end of four months had regained her usual health, and was out in the field and garden working this spring.

Dr. DAVIS: Did you save the child?

Dr. WALLING: The child was dead when delivered.

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MEDICAL EDUCATION, JURISPRUDENCE AND STATE MEDICINE.

THOMAS MCDAVITT, M. D., Chairman.

MEDICAL EDUCATION IN THE UNITED STATES.

BY THOS. MCDAVITT, M. D.

St. Paul.

A retrospective view of the medical legislation in the United States is of interest. Less than twenty years ago practically any one could practise any where in the United States. Owing to the efforts of the Illinois State Board of Health, which were only the crystalized ideas of its lamented secretary, John H. Rauch, the idea became a working force that a change was necessary in the manner of admitting M. D's. to practise. Practice had demonstrated that the average medical college was only a diploma mill. A great majority were run on purely a commercial basis. Many were stock concerns, the stock owned by the different professors, and the more matriculants the more dollars. The more matriculants permitted a diploma this year the more matriculants next year. The announcements of most colleges, theoretically, asked preliminaries altogether too low, and asked no questions at all when the party matriculated. In days not far back two winter terms of five months each brought the legal qualifications to deplete the population, and we now look back with shame to the time when an ignorant individual, never having looked into a medical book previously, could take one winter term of five months and immediately go to a spring term school and come out in the early summer a full fledged, duly authorized M. D., and could force his ignorant and unworthy self on any community of this country.

The earliest effort at increasing the time of study was due to the efforts of that "grand old man," N. S. Davis, at the organization of the Chicago Medical College in 1857 or 1858. The faculty advised three terms, but permitted two. Each year saw an increasing number taking three terms. Soon Harvard came into line, urging three terms, and very soon afterwards demanding three terms. The low grade schools were, however, manufacturing doctors by the score, and the suffering public were forced to submit. The efforts of the Illinois board to attempt to a certain extent to throw safeguards around the public in the way of looking into the genuineness of the different diplomas held by so-called M. D's. were met with hostility not only by the quacks and ignoramuses, but many medical schools fought the idea that they should be under any supervision whatever, and their own sweet will should be the only determiniag factor.

Previous to this time ideas on this question were at such a pass that a number of so-called schools absolutely sold diplomas for so much cash without the possessor ever having seen the inside of a college. These fake diploma shops were finally shut up, but much sympathy was expended on them. Many of them were closed by the admirable and far-reaching work of the Illinois board, and, as said before, they may be regarded as pioneers in medical legislation.

Virginia and North Carolina introduced legislation quite early. Minnesota followed with her law of 1883, which accepted diplomas. It was soon evident that legislation was necessary before many of the so-called first-class colleges would ever increase their curriculum. Our state had suffered from the effect of poor M. D's., from poorer medical colleges, and our best men recognized that a change must be made at the fountain-head—the medical colleges—although it might be unfair to a few of their graduates. Several of our best men, by the force of their arguments, got the law of 1887 passed, even against the opposition of many of the legislators, and, undoubtedly, many of the people. This law made three regular terms at a medical college, of at least six months each, necessary before the candidate was even eligible for examination. This was executed without fear or favor, and, while it prevented many from taking the examination, in the end it accomplished what was intended, to-wit, raised the standard to three years. The feeling exhibited by many colleges was intense, and two of the largest pooled their issues, retained counsel to fight the law, but said counsel soon advised dropping the fight. Almost all points of our law have been decided by the supreme court and declared constitutional. At our last legislation an amendment was passed increasing the terms necessary before a party was eligible for examination to four terms after 1899. Four terms are also necessary in the Medical College Association before a college can be a member.

The great point now is to force a certain amount of preliminary education before a person is eligible for matriculation in a college, and it appears that legislation will be necessary, and its execution placed in the hands of the different boards, before many colleges will adopt it. The lukewarmness with which many colleges look upon any efforts to increase the standard, or even maintain it, is one of the crying evils of the time. There is no denying the fact that the most potent element of evil in medical education at present is the unnecessary number of the medical colleges. What right many of them have of existing is an enigma. We all know of many examples of so-called colleges without apparatus or facilities for teaching, many times in small sized towns, without adequate clinical advantages. In another city of 400,000 or

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500,000 twelve or fifteen medical colleges can be pointed out. In our whole country 140. The great medical need of the country is the revoking of numerous charters, the increasing of the standard of those which remain, and the elevating of our profession to that of a learned profession. The effort to force the colleges to a higher preliminary standard, as well as a four term course (in accordance with our Minnesota law) is indicated in the following resolutions by the Illinois State Board:

RESOLUTIONS OF ILLINOIS STATE BOARD OF HEALTH.

Conditions of admission to lecture courses:

First. Credible certificate of good moral character signed by two physicians of good standing in the state from which the applicant comes.

Second. A diploma or certificate of graduation from a high school; evidence of having passed the matriculation examination to a recognized literary or scientific college, or a certificate of successful examination by the faculty of any reputable university or college, or by the State Superintendent of Public Instruction in the following branches: English Grammar, Arithmetic, Elementary Physics, United States History, Geography, Latin (equivalent to one year in a high school). One year is allowable in which to cure defects in knowledge of Latin, but the student must be provided with a certificate of proficiency in this branch of learning from the designated authorities before he can be accepted as a second course student.

Resolved, That graduates of dental surgery, pharmacy and veterinary medicine may be entitled to credit for one year's study in said recognized colleges, on complying with their entrance requirements and passing examinations in all the branches embraced in the previous years of study.

Resolved, That as a further condition of the recognition of any medical college as in good standing the college shall furnish the Secretary of the State Board of Health or State Board of Medical Examiners on or before January 1 of each year, a complete list of all its matriculants, together with the basis upon which each applicant matriculated, giving the name of the institution from which the degree or certificate of graduation was obtained, or the name of the state official conducting the examination, or the university or college conducting examinations, or the college previously attended, together with the date when the degree or certificate was issued. This list to be sworn to by the executive officer of the college and attested by the secretary, under the seal of the college.

Resolved, That students who have heretofore attended full courses of instruction in non-recognized medical colleges may be admitted to advanced standing in recognized medical colleges, complying with the entrance requirements of said recognized medical colleges, and passing other examinations in all the branches in the previous years of study.

Resolved, That no medical college shall be recognized as in good standing for the purposes of the Illinois Medical Practice Act that does not require of all matriculants after January 1, 1897, as a condition of graduation, four (4) full courses of lectures in four (4) separate years.

The synopsis of present states with their legislation indicates the change of less than twenty years from no legislation until there are only five or six lagging behind. The statistics are partly due to an article in the *Bulletin of American Academy of Medicine*, by Dr. Charles McIntire, Easton, Pa. Although written in December, 1895, there have been laws passed in some places which had none then.

TABLE I.

a. States and territories whose medical laws practically permit any one to open an office to practise medicine:

Alaska, Arizona, Idaho, Indiana, Kansas, Michigan, Nevada, New Hampshire, Texas, Wisconsin and Wyoming.

b. States and territories which merely exercise a supervision of the diploma held by the person desiring to practise medicine:

California, Kentucky, Missouri and Nebraska.

c. States and territories which require an examination for license, but accept the diplomas of certain colleges as evidence of that examination:*

District of Columbia, Ohio, Arkansas, Colorado, Connecticut, Illinois, Indian Territory, Chocktaw Nation, Iowa, Massachusetts, New Mexico, Oklahoma, Rhode Island, South Dakota, Tennessee and Vermont.

d. States and territories that require passing an examination before a state board of examiners before issuing a license to practise medicine:†

1. A single board of examiners:

Alabama,‡ Indian Territory, Cherokee Nation,§ Maine, Minnesota, Mississippi, Montana, New Jersey, North Carolina, North Dakota, Oregon, South Carolina, Utah, Virginia, Washington, West Virginia.

2. Two boards of examiners, one of them homœopathic and another ecletic:

Georgia, New York and Pennsylvania.

e. States from whom no reply has been received to letters of inquiry:

Indian Territory, Creek Nation.

*It must be remembered that each state determines for itself the colleges whose diplomas will be accepted.

†In some states the candidates for examination must possess the certificate of graduation from a medical school (if an American school the degree of M. D.); other states make the examination the sole criterion of fitness to practise.

‡Each county has its board of examiners.

§There is a board for each judicial district.

‖Florida has one board for each judicial district and a homœopathic board for the state at large.

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PUBLIC HEALTH AND THE PROFESSION OF MEDICINE.

By Charles N. Hewitt, M. D.

Professor of Sanitary Science in the University of Minnesota: Secretary of the Minnesota State Board of Health.

Minneapolis.

The question I have to submit to the Section is this: What is the relation and duty of physicians to public health?

Health is a state of the whole man, in which he is most thoroughly prepared for the natural use of his every power in any stage of his natural life. It includes all of him: body, mind and moral nature. Its study is hygiene, its application to community needs is public health.

The foundation of health is in two classes of facts:

First. Those of man's environment, which preceded him in order of time: the material world, plants and animals.

Second. Those of his own organization and relations. As we have to do with men from the standpoint of hygiene and medicine. They are divided into two classes: healthy and unhealthy; and their environment is studied, as it promotes the one or the other of these conditions.

The healthy are those who are prepared in all essentials for the duties and the satisfactions of normal life. The unhealthy are those who from lack of one or more of these essentials are "out of condition," and, so far, partly or wholly disabled for normal service.

The healthy are the hope of the race: its natural aristocracy. To keep them well and to increase their number and efficiency is the highest duty of the race, and the end of both public health and medicine.

It is not the fault of physicians that the majority of civilized mankind belong to the unhealthy class, or that the chief demand for the service of physicians is to cure the sick and disabled rather than to help the well to keep so.

Though it stands to reason and common sense that health, as above described, is a primary and essential condition of the whole man for the greatest efficiency and happiness, yet it does not seem to be the opinion or practice of the majority of men. On the contrary, it is common to think, speak and act as if man had at least three separate selves. The old notion that the intellectual man was a tenant of the physical man, and had the moral man as a sort of partner; that the physical man was an employé of the others, unfortunately necessary, but of another sort, is still apparently the belief of many learned and educated people.

All this perversion of the truth is one of the most persistent bars possible to a true conception and pursuit of health, for it is out of their own health, as of their other personal conditions, that such men reckon their everyday standards. They may dream of some other and higher one, but their own average of attainment is usually that which they set up for others.

The fact, however, from the physician's standpoint, is that man is composed of matter, built up by life, and endowed with intellect and conscience. His mind, counseled by his conscience (a cultivated instinct, perhaps), has, within limits, liberty to decide conduct, and influence that of other men. But give to this power of initiative and accomplishment the widest scope to which it has any claim, there still remains evidence in man's organization, as in the constitution and course of nature, that her forces and processes, her agents and results, include him as much as the plant or other animal, and condition him inexorably in many ways from the beginning to the end of his life. The matter of which his body is made is that of which all other things are made. Coming into relation with vital and intellectual forces, matter is not changed or relieved of the operations of physical forces which entirely controlled it before their association began, and will succeed them when the association is broken by death. All the forces we know anything of in nature operate upon man. Life does not supplant, but supplements inorganic forces in fitting matter to serve a still higher mission in the vegetable and animal world, where, in turn, at its furthest advance, it takes another association with mind, and the outcome of this union of matter with material, vital and spiritual forces, is man. It is fortunate that this statement describes a fact, whatever may be the nomenclature one may give to the things and forces coöperating for the result and how they accomplish it. The important point in this connection is this, that no one or two of the forces could alone effect the result, nor matter alone, nor one of the forces with matter, but all must coöperate in definite ways to produce a healthy man. Altogether, in a predetermined way, they produce him, prepare him for his destined place, and after he enters upon his partly independent life they still direct him in many essential ways, and stand ready to coöperate with him in his special work, if he avails himself of their aid. Within limits which are natural and not artificial (i. e., fixed by forces outside himself and not by his judgment or inclination) he has a large liberty of thought and action and voluntary power to influence other men, animals and plants; while other men and plants and animals, too, in their place react upon and influence him. Man is a part of nature, not apart from it; he is one link in its work, one result of its operations, associated with

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all that is gone before, and all that is best of himself, his hopes, his fears, with what is to follow. Medicine is founded on this great truth, and demonstrates every day how far short of what he was plainly meant to be and do he comes. But, happily, she finds as constant evidence of his disposition to do and be better in himself. It is that condition of man (of the whole man) which we call health, which furnishes the evidence and the hope of his future. Without it our daily routine of diagnosis, prognosis and treatment of the sick could never have attracted and retained the long list of good men whose wider vision has taught them that our art can learn from nature, through science, not the secret of health, for we have it, but the means to secure it for ourselves, and to persuade other men to seek, get and use it. It rests with physicians who know and use these fundamental facts and want others to know the truth, which shall, if they will, make them free in a very high sense of that much abused word, to begin to do so now. To that end we must follow nature's lead, and deal with individuals and the family. The best work which any man can do is in this direction, in the circle of his individual influence, in his own field where he wins his daily bread. The mistake with us is the common one of supposing that a movement for more natural life, for more health, must begin in a public assembly with a discussion, organization, resolutions, committees, and that little can be done in any other way. It is the fashionable way; it dissipates individual responsibility, occasions voluminous speech and writing, and is useful to reach numbers of men and women who are difficult to get at in any other way. For a strong man it is a help if properly used.

I do not intend to discuss this method now, but the opportunities and obligations of the general practitioner of medicine in hygiene. I must assume him to be not merely well read in books, but one who reads men, observes, thinks, and is a lover and student of nature. I have learned that the wisest health officers of my acquaintance have been lovers and cultivators of some field of natural science, with an ear and eye open to every source of knowledge which they could use. Who does not know a country doctor whose life and language are saturated with the influence of natural observation and experience, even when the facts so obtained lack technical arrangement?

It is this class who stand very near the interior life of most people every day, and who know, or may know, if they will, their sanitary needs, and how to persuade, exhort, entreat, and, in emergency, command them.

The essentials of human life, health and efficiency are primarily physical and of inorganic origin. In importance they come in something like this order: soil, air, light, water, food, clothing; and it is not as well known as it ought to be that if communities would secure to the families which compose them *pure soil and pure water*, the leading first and secondary causes of ill health and specific disease would be enormously lessened, and other essentials would almost take care of themselves.

I have not time here to prove this radical statement, but it is the outcome of my long study of the subject, and I commend it to your consideration and support. If it is true, the obligation to impress it upon communities bears more heavily upon the physician than upon any other citizen.

Another essential fact as to health is that it is *first of the individual*, and the individual is the sanitary unit; that is, it is the facts of his organization and relations discovered by observation, experience and scientific research which furnish the material upon which the precepts of hygiene for him are founded.

The individual is the unit of all human association, and finds his origin and first society in the family. The family is the beginning and mother of all human communities. Its work, as such, is as essential today as it ever was, even more so, for without it, no civilized or Christian society could exist or thrive. The family is the perpetual feeder of communities, and upon its integrity and healthfulness, the integrity of all human association depends. This is not the favorite opinion of much sociological endeavor today, but fron the standpoint of hygiene and the facts of human origin, health, disease, progress, no other foundation is possible, no other ideal exists; it is the field of the physician where his knowledge of hygiene begins the work of public health. Another fact constantly ignored is that the object of public health is to maintain health, assist the healthy to keep so, to forfend disease and disability for the whole healthy man, not to cure the sick nor repair the disabled. This is so, simply because the state of health is fundamental for the perpetuity and improvement of the race. But we are constantly reminded of the fact that the majority of men are not healthy, and they must be cared for. Medicine knows this fact better than any other science, and it provides for it as no other human agency can; it knows the duty and does it. The duty is a secondary one, nevertheless. A parallel with other human work will illustrate the true bearing of the fact. The maker of machinery of all sorts finds that he must be a repairer also; and while he finds his duty and profit in the last, would write himself a fool if he should argue that his best work was in repairs, or that that was the real end of his occupation; how much more is it true of nature, that while she affords means for the partial restoration or repair of sick and disabled men, aims most of all to beget healthy ones, and keep them so, and favors the last, while she partially tolerates the first, and even crushes them out if they endanger the healthy. I need not do more than state the fact that the organization of much of our society, municipal and state government,

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charity and public associations, law, rules and expenditures of time, thought and money are for the benefit of the sick and disabled at the cost and sometimes to the injury and loss of the healthy whole man. Yet if one could remove the healthy men, women and children from a community or state no one denies that the "bottom" would go with them, and that from natural causes alone the extinction of the remainder would surely follow. You can test popular judgment, or that of sociologists and reformers; if you ask them to define what they understand by health they will agree most certainly in defining it as a very indefinite physical condition; and yet it occurs to you constantly that an apparently healthy body, so far as the layman can judge, is often associated with a very sick mind and conscience; that an athlete may be a moral pestilence, a mental degenerate, a dangerously sick man. But it is not necessary for my argument to enter the debatable field of the relations of society to the care of the sick and disabled, the dependent, the criminal or degenerate in any direction. I am concerned now only with its and the physician's duty to the healthy and well: how to increase their number and protect them for public good. That is, I repeat, the first aim of medicine and public health. Just in proportion to the increase of their number and the duration of their life and work will be the diminution of the number of the unhealthy and the increase in the efficiency and happiness of the race, the diminution of family and social burdens of all kinds by the removal of sickness, disability and premature death. To further this so desirable consummation no one has the knowledge or opportunity of the physician who will learn the facts and the ways which are now at his disposal.

It is perhaps unfortunate in the æsthetic sense, that he must continue his present work of picking up the fallen instead of cheering those who most stand upright; witnessing and enjoying success, and furthering it. This must be his duty for a long time to come. But it has its compensations; rightly used it leads him nearer to the higher and better work. The old terms, diathesis, inheritance, predisposition and the like, have a new and clearer meaning now. Disease is not so indefinite a term as it only recently was; remedy is not so often a drug merely; cure means much more than dosing; recovery is not so easily confounded with palliation, and our profession in helpfulness is less a promise and more a realty.

One hundred years ago last month, Jenner, a country practitioner, with the experience of a dairy maid to prompt him, found in a stable the most nearly perfect preventative of a specific disease yet discovered by man. The experience of the savage discovered cinchona, another preventative for a specific disease, which has not yet been supplanted by the research of the laboratory.

Climatic conditions as favoring health and forefending disease, were matters of common experience before they had scientific demonstration. Men appreciated and sought pure air, water, food and other normal essentials of health, by the guidance of instinct and teaching of experience long before science came to demonstrate; *why?* The history of man, from the time that he began to attempt to manage his own affairs, has been the record of an effort at independence of all other direction than his own. He began in the deepest superstition, with utter dependence on the supernatural, for motive and direction. He still professes in his religions such dependence and faith, and they underlie the conduct of the greatest number of civilized people. But science today, as represented by the large majority of its most distinguished students, discoverers and teachers, ignores or puts aside the supernatural in nature or mind, as do many of those who pose as leaders in the systems of social or political reform, which are attempting to deal with the so-called "problems of the time."

The admitted evils which accompany the civilization of today are, unfortunately, the more important of them fundamental ones, involving the foundations not merely of customs and indifferent things and beliefs, but the well-being and conduct of the most of men. The knowledge of natural things and forces, of mind and morals, of right and wrong in thought and conduct, are still treated as if the peculiar field and preserve of the learned, and the number of this class has been increased by the addition of the students and original investigators of modern science, outside the old professions, and the speculators in the field of society and government. Still, even with these additions, the "learned" constitute but a small proportion of the mass of men who have the same natural right to think, conclude and act, and even a more pressing duty of doing than the "learned" have. Most of the study now devoted by these learned folks in the department of philosophy, psychology and history, to the solution of these "problems" proceeds upon a "theory" as much as did the study of the old time, when facts were of less apparent necessity than now. Though no one class of the learned have anything like the opportunity to know the essential character of such of these "problems" as relate to social needs and conditions, as physicians have, none are less considered or consulted about them.

An immense number of people imagine a science to be called sociology. Their associations have been unable to agree upon a definition of their prospective science, but they have a theory and have begun to look for facts, and classified and defined their methods and terms as follows, which I take from a text-book on the subject; "Sociology is a new phase of social thought." "Social problems are evolutions of facts observable wherever there are men, women and children." "So-

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ciology is the last reading of these familiar facts." "Sociology has no other task and no other evidence than the task and the evidence which the facts of the associated human life contain." (Small Introduct., p. 16). "Sociology is thus the organization of all the material furnished by the positive study of society." "First, *descriptive*; coördinated facts of society as it is; second, *statical*, the ideal which right reason discloses of society as it ought to be; third, *dynamic*, the available resources for changing the actual into the ideal." (*Ibid.* p. 20). "Twentieth century sociology must focus all the centuries' knowledge upon the latest century's peculiarities" (p. 75). "Sociology is both a science and a philosophy. *Socialism* is a programme. It assumes that which sociology investigates. At present it is related to sociology much as astrology was to the early history of astronomy, or alchemy to the beginning of chemistry" (p. 76).

The real social question, "What is the best that the human race can live for?" "The aim of sociology is the development of social health, not the cure of social disease." "Society is such a combination of human organisms that the resulting phenomena compose an organism of a higher order" (p. 91). "We treat society just as we might imagine the anatomist treating the human body if all the vital processes could be exposed to simultaneous view." "The individual is a factor of a larger self and the larger self is the object of sociology." With these definitions, guarded and amplified, the book proceeds to study the "natural history of society," "social anatomy," "social physiology and pathology," "social psychology," and proposes to be a guide to students, a "manual for beginners." I doubt if many physicians have any just idea of the extent to which the idea of society that underlies this and similar social studies is accepted by teachers, and by cultivated people, nor of its influence on thought and life. It amounts to this, apparently, that society is a unit of which the individual is but a part, having no individual existence apart from society, and no individual independence, being conditioned by every other individual or by the whole of which they are but parts. From some such idea as this has come the conception of the state as the centre, not only of authority, but of social organization, "human evolution being conditioned by social unity and solidarity" (Davidson, *Forum*, June, 1896, p. 463). You will note that the field of sociology includes conditions and "problems" which are within the field of medicine, and subjects which have for centuries been a study there, with a view to their amelioration or abolition. Take a few examples of what are called the nomenclature customary among professional reformers "great social problems demanding solution at this time;" "the social evil;" "the temperance question;" "the tenement house question;" "the care of abandoned children;" "hospital provision for the sick poor;" "poverty and pauperism;" "insanity, vice and crime;" "the care of disabled and degenerate," etc.

These questions suggest another: Who stands nearer to their causes, their victims, their results on individuals, families and communities, than the physician? Who can as intelligently discuss their prevention, restriction or cure, or suggest or use means to that end than the physician? But who listens to or consults him among those most pronounced in their devotion to the associated discussion and treatment of these allied questions? What is he doing individually or as a class to help in their solution? Let each one answer for himself. My object is to call upon physicians to come up to their opportunities and duties to society, as they ought to do. For there is a broader and more intimate view of these social questions which physicians are peculiarly fitted to study. It is to that that I beg to ask your attention today. The physician must clear his record by proving that he has other and higher duties than caring for the sick and their recovery from disease or injury. That is a noble task, and his belief that it is so has abundant proofs in acts, but it would betoken an ignorance of which he is not guilty, did he not have a higher ambition, and claim a greater victory in the prevention of disease and the forefending of injury.

The public health service of Minnesota today stands for this belief. It began in the State Medical Society; its members and officers include physicians; its strongest supporters are physicians. But do health officers represent the individual work of the physician in public health? No. They cannot. The health officer is an official of the law, which requires him to enforce it in communities, and to investigate disease. He rarely reaches the individual or the family, or, if he does, it is in a way little favorable to personal influence or instruction. The family physician is the medical representative to the individual and the family of public health. His opportunities are more frequent than any other man's; his relations are more intimate; his influence and authority greater in all that affects health. He knows the facts which underlie and occasion the social problems about which we hear so much from other sources. He may know and deal with their causes very often better than any one else can. Every one of them belongs to his profession more than to any other of human devising. They are of conceded importance. Will he continue to leave them to others? Or will he in his practice, and, when possible, in his professional association, do his share for their solution? Most of his best work, fortunately, must be in private and confidental, and for that very reason may be most efficient and enduring. He cannot illustrate a discussion by their relation, for his instincts and training disable him from the public dissection of vice or sickness. But, none

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the less, he can bring his experience and results to the knowledge of his brethren, where mutual discussion and conclusion as to methods may make coöperation possible.

A section of the Society ought to be one field for such study, to help remove from our profession the reproach that we are not workers for social health nor interested in social advancement. The physician should claim and fill his position as a social force for these purposes where he lives. If he will do so, and bring the families he serves to appreciate and secure a clean soil, pure water, a clean house, with abundant pure air and sunlight, disease, vice and physical degeneracy will get a "set back," and health and happiness a boom which no other man or class of men can give.

Will he do it?

THE MEDICAL EXPERT.

By Pierce Butler, Esq.

County Attorney of Ramsey County.

St. Paul.

Mr. Chairman and Gentlemen:

It is with great diffidence that I assume to discuss before you a subject so important, concerning which much controversy exists, and to the improvement of which many eminent men in both the medical and legal professions have given their thoughtful consideration. It is well known that much time is spent by lawyers in trials of cases involving important medical questions, in criticism, often amounting to the severest denunciation, of the conflicting views of the unfortunate medical experts who have testified in their case. Believing, as I do, that much of the criticism of the medical expert witness is unjust, and that courts, laws and lawyers are more responsible for the present dissatisfaction commonly expressed than are the medical men, I would gladly yield the time allotted to me for this discussion to some medical man, in order that the subject, from his standpoint, might be fully heard.

Medical experts are generally selected by the parties to the controversy by reason of their special knowledge of the points at issue, and for a two-fold purpose, first, to discover, examine and estimate the facts upon which the case turns, and to give to the court their opinion upon them, and, second, to give their opinion upon statements of fact recited in "hypothetical questions" framed by the lawyers, or testified to, in their presence, by the witnesses of the contending parties. In either case the expert witness, to some extent, assumes the function of the court and jury, and passes judgment upon some point at issue, not, of course, the credibility of witnesses or the value of testimony, but gives his conclusion upon the facts observed or assumed by him to exist, that is, he states the rule of medical science applicable to these facts. In the first instance I have mentioned the facts which form the basis of his opinion are within his own observation and may be called for, after the expression of his opinion, in order that the value and correctness of his opinion may be fairly tested. It is right here that the difficulty and misunderstanding so often attendant upon such examinations arises. The judge don't always understand the reasons given for the opinion expressed, frequently the opposing lawyer don't want to understand them, and more often the jury can't understand them. In the second instance the facts recited in the "hypothetical questions," or testified to by the witnesses, are not clearly made to appear, for it is very difficult for a lawyer or witness to describe or state the facts essential to the proper determination of a medical question in such a manner as to be of equal value, or of nearly equal value, to the actual observation of the skilled expert. Then, too, one party puts a question to *his* expert, every fact recited in which is abundantly sustained by convincing proof already in the case, and the opinion is given; the other party puts a question to *his* expert, many facts recited in which are not sustained at all, but in support of which there is some slight testimony of perchance an interested or dishonest witness, and the opinion is given. "The doctors disagree," and disagree they must, to be honest. The jury fails to correctly understand and to logically apply the rules of law laid down by the court for its guidance, justice fails, the injured party complains, and disinterested but honest observers, not well informed as to the circumstances, cry out against the wrong committed, and the medical expert is subjected to the harsh criticism of the public.

This fairly illustrates some, and perhaps most, of the "disagreement" so much complained of. What, then, is wrong? I said that the expert was usually *selected by the party*. In many of the controversies which occupy the time of courts important and essential questions arise to the determination of which must be brought the learning, observation and judgment of medical men. Examples of these are found in insurance, damage, will, criminal and many other cases involving property, human liberty, life, reputation and character. In cases like these, involving consequences of the very gravest character, the interest of the parties demands the adoption of the most powerful means for the contest. The best lawyers are retained, and are supported by eminent medical men, hired and paid in much the same manner as the lawyers are, in preparation for the trial. Loyalty to client, pride of opinion and interest are apt to change the expert from witness to advocate. The situation of the expert so retained is

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indeed an embarrasssing and difficult one. His experience and life work, in most cases, has been confined to the seclusion of the hospital and the sick room. He has not been taught and trained in the full light of public observation and unsparing criticism. He is brought to court, where the most important consequences depend, not upon his actions maturely taken, but upon his judgment and recollection of the rules of the medical science hastily given, and oftentimes upon facts, some of which are, perhaps, for the first time brought to his attention. Even to his form of speech and words uttered in answer to questions shrewdly devised in the interest of one or the other of the parties, much importance is attached.

Between the anxiety of the party in whose behalf he is called and by whom he is paid, lest all of his answers be not favorable, his desire to be logical and truthful. the cross examination and assault of the opposing lawyer, often unfair and sometimes ungentlemanly, his own natural desire to sustain his opinion and to resent attack, he is fortunate indeed if he passes unharmed the cool observation of the presiding judge, the impartial and critical judgment of the jury, and the frequently inflamed and sometimes unjust opinion of the public.

It often happens, I think, that the testimony of the medical expert is unconsciously or consciously warped by the retainer. The hiring of a witness is equivalent to asking for help, and cautious indeed must be the expert that no essential fact is omitted in making up his opinion, and that no point is strained in favor of *his* side of the case. The system of hiring expert witnesses and thereby making of them medical advocates is wrong, and should be abolished.

There seems to be great difficulty, however, in providing any other satisfactory method in its place. The most important and most frequent inquiry on which medical experts are called are cases involving the issue of sanity or insanity. This question is to be determined by the court, or by the jury under the instructions of the court. In criminal cases where the defense of irresponsibility on account of insanity is interposed the court instructs the jury as to what degree of insanity excuses the crime. In this state there must be "such defect of reason as either not to know the nature and quality of the act, * * * or that the act was wrong." In will cases the rule by which the competency of the testator is tested is commonly laid down to be that "a person who, at the time of making his will, has an understanding of the nature of his business and a recollection of his property, of the persons who have claim upon his bounty, and the manner in which it is to be distributed, has sufficient mental capacity to execute a will."

It is the practice in these and similar cases for the court to give the jury the rules by which responsibility and competency are to be tested; and responsibility and competency are the ultimate questions to be determined, not by the medical expert, but by the courts and juries. The experts may testify as to the state of mind, the condition of health, and the rules of the medical science which apply to the facts in the case, and the courts and juries consider these in the determination of mental capacity.

It has been urged that the question of sanity or insanity is not one of law but one for medical men, and, as such, should be determined by the rules of the medical science; and the mode suggested for making such determination is the selection of a commission from among medical experts to examine the subject and to inquire into the facts bearing upon the question, and to finally determine the question of mental capacity. It seems probable that this could be done in some equity and probate cases, but there are constitutional objections to this mode of procedure in criminal cases involving the question of guilt or innocence. In the latter cases, and many others, such a system invades the right of trial by jury.

The method of examination of medical experts by "hypothetical questions" is the source of many of the apparent "disagreements," and is as objectionable as the hiring of medical experts. These questions, framed as they frequently are in a shrewd and deceptive manner, are the source of much confusion and annoyance to both court and jury. It has been suggested that these questions should only be propounded by the court after full consideration of the material facts in evidence. This would afford little if any relief, for the reason that the judge would feel constrained, upon motion of counsel, to put almost every conceivable form of question which the ingenuity of counsel could suggest, and the danger would be so great that the evils now existing would be aggravated and not reduced. It has also been urged that the court and jury should make special findings of all the essential facts, which may be submitted to a commission of experts, and upon which the medical question is to be determined. The danger of adopting this proposition is that the multiplicity of findings, especially in jury trials, would create a confusion that would be more harmful than the evils of the present system.

It is easy to criticise. Any one can destroy, but it is the work of a genius and a statesman to discover and enact into law some system for the determination of these important medical questions by which the present evils shall be avoided, and to which no serious objections will attach.

Great advance can be made by the education of lawyers in the general principles of medicine, by the education of medical men in the general principles of law, and by the education of the common men, of whom juries are usually composed, in some general principles of both law and medicine. Many

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of the misconceptions causing the present discontent and dissatisfaction will be thus removed. Unjust criticism of medical experts by the courts, lawyers and the people will be lessened. The medical expert will not be so severe or unjust as he often is upon the courts, the lawyers and the juries. Greater candor, dignity and fairness will characterize contests in which there are issues requiring the assistance and judgment of medical men. The administration of justice will not be so often marred by harsh criticism and personal contention of witnesses and litigants, and the medical expert will experience the more kindly consideration of the public when called to the assistance of courts in the discharge of one of his highest duties.

In addition to the remedy of general education along the lines mentioned, I hold that the state should provide by means of appropriate legislation a bureau or commission of medical experts, or a number of such, to be paid a fixed and ample salary. Let such experts be selected by the judges of the supreme court, with the advice and assistance of the judges of the district court in the various districts. This will be a sufficient guarantey that the best men will be selected with the view of furthering the public welfare. Give to every litigant and court the right to call for the services of these experts without costs and upon all questions where such services can be of assistance. This, of course, would not make it unlawful or impossible to call other experts as they are called under the present system, but it would make it unnecessary, if not indeed unwise. Honorable members of the medical profession outside of the official lines of these bureaus or commissions would be unwilling, except, perhaps, in exceptional cases, to offer or to give to either party their services in the manner in which they are now obtained. Every interest of the litigant would admonish him to seek to establish his rights by means of the officials provided for him at the public expense, and, as a matter of policy and wisdom, he would refrain from attempting to secure the assistance or interference of outsiders.

Such a law wisely executed would furnish to the contending parties equal means for the contest on expert questions. The interest and consequent unfairness of the hired medical expert would be wiped out. The testimony would be given without regard to the interest of either party or to the event of a trial, and upon every phase of the testimony and of the facts. The attack of the cross-examiner would, of necessity, be less frequent and severe, and the absence of the confusion arising upon such examinations would leave with the jury greater ability to accurately remember and correctly apply to the facts, as it finds them to exist, the opinions and rules laid down by the medical men. With men of the highest character and ability in their profession chosen to serve the public in this capacity, honesty, fairness and candor being thereby insured, litigants would stand upon equal footing, the poor and weak as strong in the legitimate means to enforce his rights as the rich and powerful.

If such a system is adopted by law hired medical experts will disappear, and with them most, if not all, the legitimate complaints that are now heard against them, and the men called at the expense of the state, with no interest direct or remote in the controversy, will honestly and boldly do their duty, knowing that it is of the very highest importance, that in all controversies involving the establishment of human rights, that all the truths of science and all the wisdom of the ages should freely come to the assistance of man in his effort, frail and faltering though it be, to do exact justice, God's justice, in our courts under forms of law.

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GYNÆCOLOGY.

WALTER COURTNEY, M. D., Chairman.

THE VARIOUS FORMS AND SYMPTOMS OF PUS IN THE PELVIS.

BY WALTER COURTNEY, M. D.

Brainerd.

As Chairman of this Section, and on request of the Executive Committee, the duty devolved on me of selecting some dominent subject, or subjects, in gynæcology for a symposium of papers to be presented at this meeting. In selecting "Pus in the Pelvis" and "Uterine Fibroids," for written and other discussion I sincerely hope the choice will meet with the approval of my fellow members in this Society.

While making no pretension or claim to the title of gynæcologist, still, as one actively interested in general surgery, I am aware that gynæcologists have been for some time giving deepest thought and attention to the subject of pus in the pelvis, in fact it seems to be of universal interest if not paramount to all others. Particular attention has been given to treatment; let us hope that this may be further improved by future study of its pathology.

Uterine fibroids (using the common name for these benignant neoplasms) have, since the advent of hysterectomy, held the faithful attention of all who have to do with woman and her diseases.

The subdivisions of these subjects (see programme) has not been made according to arbitrary rule, but rather with reference to the salient points that the writers on each may bring out, and the space of time at the disposal of the Section.

A brief and passing notice of the chronologic history of pus in the female pelvis will show that some knowledge of this subject was possessed by very early medical writers. Allusion was made to it by Archigenes of Apamea in the second century, Oribasius of Sardis in the fourth, Ætius of Amida in the sixth and Paul of Ægina in the seventh. Some of the more modern writers are, Wiseman, of England, about 1680, and Nicholas Puzos, of Paris, about 1743. In 1841 Bourdon, of France, wrote of "fluctuating tumors of true pelvis;" in 1843 Doherty, of Ireland, wrote of "chronic inflammation of the appendages of the uterus;" in 1844, Churchill, of Ireland, wrote of "abscess of uterine appendages." Auguste Nonat began his investigations about 1846, and a decade and a half later Bernutz and Goupil did their masterly work. Since that time the writers on this subject in France, Germany, England and America, and other countries as well, have been steadily increasing in numbers, year after year.

More than sixteen years ago, Thomas, of New York, stated that "there were three sources of pelvic abscess: First, breaking down of tuberculous material deposited in any of the tissues of the pelvis. Second, suppurative action taking place in the walls of a cavity formed by an hæmatocele or ovarian cyst. Third, inflammatory suppuration in the areolar tissue, the ovaries, the tubes, the pelvic peritoneum or the parenchyma of the uterus itself." This description of the sources of pus in the pelvis it would be difficult to improve upon, even at the present time.

In giving consideration to the various forms of pus appearance in the pelvis, attention will not be paid at this time to vaginal and intrauterine accumulations, purulent cystitis or urethritis, nor to those arising from tuberculous destruction of contiguous bones.

Pyosalpinx: Of all the forms of pus in the pelvis this is the most common, and for that, as well as other reasons, the most important. Its development, almost invariably by extension from the endometrium, may be slow and insidious, or, in some cases, very rapid indeed. In some cases we may have unilateral pyosalpinx, which, after a time, may become bilateral, or there may be double pyosalpinx from the first. In a very few cases the second tube may remain unaffected, its uterine ostium having been closed by adhesive inflammation. We may also have tubo-ovarian abscesses as a result of the infection extending through the abdominal ostium to the surface of the ovary.

The size, shape and position of pus tubes are very different in different cases. In size they may not be increased very much beyond the normal dimensions, or they may be so large as to fill a good portion of the iliac fossa. In individual cases the size may vary, from escape of contents and refilling again. Escape of the pus may be due to the efforts of defecation or other causes of muscular contraction, or from direct pressure, as the examining finger, and may be into either the uterus or the peritoneal cavity, depending on which ostium is open. The shape is varying, the most common being club shaped, with the small extremity towards the uterus; sometimes they are convoluted, sometimes sacculated from a strictured canal. The position of these diseased structures will depend a good deal on the position of the other pelvic organs, particularly as regards the uterus; if this is placed in a normal position the diseased tubes are likely to be more or less similarly situated. Sometimes we will find one tube buried deeply in the lateral fossa of Douglas, while the other may be doubled up like a sausage and presenting in the wound during an abdominal section.

Ovarian Abscess: Abscess of the ovary without conjoint involvement of the related tube is, accord-

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ing to Tait, quite uncommon, and I believe there are others who will concur in the statement. However, it is occasionally met with, but the causes of infection and its production belong to another writer for description.

Suppurating Ovarian Cysts: Suppuration may appear in any form of ovarian cyst, and constitute one of the most dangerous forms of pus appearance in the pelvis. The very cause of infection itself may lend an additional danger, as, for instance, when there is fistulous connection with the intestine.

Suppurating Pelvic Hæmatocele: This condition (speaking of the intraperitoneal form) is not so common now as it once was, for the reason that extrauterine gestation is much more frequently diagnosed than it used to be, and early operation, either before or after rupture of the sac, prevents what would, in many cases, result in an infected and subsequent purulent breaking down of the hæmatoma.

Suppurative Pelvic Cellulitis: It is not so long ago that cellulitis was supposed to be the usual cause of "pelvic abscess." Today there are many who would practically exclude it as a cause. We are too apt to rush from one extreme to another. There is no longer any doubt in the minds of any that it is a rather infrequent cause; still, I think there are good reasons for believing it to be an occasional cause. Why we may not have an inflammation, that is always infective in character, in the cellular tissue of any part of the pelvis as well as in the orbit, I fail to understand. The lymphatic vessels being active agents in its production are doubtless as active here as elsewhere.

Suppurative Pelvic Peritonitis: Peritonitis causing suppuration is secondary to something else, and usually presents itself in two forms: One where the process is diffuse and the pus more or less mingled with fibrin; the other where it is inclosed in peritoneal adhesions and plastic exudates.

Appendiceal Abscess: It not infrequently happens that an abscess with its origin in the appendix will simulate very closely true pelvic abscess of the right side. The appendix is often found low down in the pelvis and may be attached to the ovary, Fallopian tube, uterus, bladder or elsewhere, and if it becomes perforated abscess is almost certain to follow. Mundé, in one of the March numbers of the *Medical Record*, for 1895, describes several very interesting cases of this nature.

Abscess in Uterine Walls: This form of pelvic abscess, when it appears, usually follows parturition or abortion, but is sometimes the result of faulty operation. Penrose reports a case, in the *American Journal of Obstetrics* for May, of the present year, where he is much inclined to believe that an attack of appendicitis, with operation, and followed nineteen days later by abortion at three and one-half months, was the real cause of an abscess that appeared in the uterine wall. These cases are attracting marked attention, prompt hysterectomy being recommended by Lusk, Baldy and others.

Tubercular Abscess: This form is not very common in the pelvis and when it does appear is often due to mixed infection rather than to the tubercle bacillus alone. It may attack any one of the pelvic organs. The tuberculous deposit may be a primary one, but is much more likely to be secondary. The difficulty of finding the bacilli in abscesses that have existed for some time is probably due to the fact that they have passed into the spore stage.

Perivesical Abscess: In view of what has already been said in regard to cellulitis, but little time need be given to this form of pus appearance. Hallé defines pericystitis as "an inflammation of the perivesicular cellular tissue, consecutive either to a cystitis or to a phlegmasia of the pelvic organs."

This will complete the list of the different forms of pelvic abscess to be mentioned and described at the present time. Any others must be very rare and not of sufficient general interest to warrant the expenditure of valuable time in view of the work before us.

Symptoms: These will not be lengthily nor very fully discussed here. To do so would be to intrude too far into the domain of diagnosis, which rightfully belongs to another. The various forms of pelvic abscess present a complexity of symptoms that merge and run together to such an extent that but few stand out clearly from all others to mark any particular form. If we were compelled to make our diagnosis on symptoms alone we would very often go wide of the mark.

The difference between the symptoms of acute and chronic forms is largely one of degree. In some of the acute cases they may be terrific and apalling, while, on the other hand, they may be surprisingly mild and weak in many of the chronic cases.

The symptoms are well divided into local and general. Among some of the prominent local symptoms we may mention recurring attacks of local peritonitis and discharges of pus through the cervix, which strongly indicate pyosalpinx; pain and fullness in the affected region, and sometimes pain at points of distribution of the crural and ob durator nerves from pressure within the pelvis, vesical and rectal irritation. In addition to these there may be fistulous openings into the vagina, rectum and bladder, and symptomatic, because of the unnatural discharges.

The general symptoms may be slight and not very well marked, or they may be severe and alarming. The daily exacerbations in temperature, pulse and respiration are important in marking the severity of a given case. Sweating is also an important symptom as an indicator of the pres-

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ence or absence of general sepsis. Other important general symptoms are impaired appetite and digestion, with progressive emaciation and often a peculiar color of the skin.

THE VARIOUS CAUSES OF PUS IN THE PELVIS.

By W. J. Mayo, M. D.

Rochester.

From the time Lawson Tait revived the correct pathology of pelvic suppuration from the obscure position it had occupied after the labors of Bernutz and Goupil, to the present period, the advance in gynæcology has been from a clinical and operative rather than from a pathological standpoint. With Price, Kelly, August Martin and a host of others to lead the battle, the fallacy of pelvic cellulitis, as previously understood, was quickly won and gynæcology became the centre of attention.

This sudden rise to a commanding position led a great number of men to engage in this work as a specialty, and others to turn longing eyes upon it as a profitable field. Operation succeeded operation. First the diseased ovary and tube came out, then both for fear the second should become diseased, and next the uterus followed the same fate. The art advanced beyond the science. New technique rather than scientific investigation became the order of the day. The result has been a growing suspicion in the minds of the medical public that gynæcology had run mad, and wholesale denunciations of the gynæcologist and his methods were not slow to appear. For instance, notice President Cole's address before the last meeting of the American Medical Association, and also the address in surgery by Dr. Senn before the same body of practitioners. Assertion will no longer do, nor will statistics of recoveries answer the purpose. Scientific investigation alone will be of avail.

It is pathology that is wanted, not clinical experience, and by request of your chairman I will at least make an attempt to demonstrate that in the different causes of pelvic suppuration lies the solution of the disputed problem.

THE EFFECTS OF GONORRHŒA.

The discovery of the gonococcus by Neisser has enabled careful investigation of the claims of Noegerath which had been supported by Tait, Sinclair and to a great extent by the majority of modern gynæcologists. This work has finally led to good results. The universal acceptance of the view that intrapelvic suppuration traveled by continuity of structure from the vagina to the uterus, and from thence to the Fallopian tubes in the vast majority of instances, rendered the idea natural that a pus tube, originating in a gonorrhœa, must be due to the gonococcus, but when a large number of competent observers, such as Roswell Park, Williams and others demonstrated that the gonococcus was not a pus producer, in the ordinary sense of the term, much confusion was the result; although upon this question there is a great difference of opinion among leading bacteriologists.

This seeming disproof of the assertions of the operating gynæcologist was looked upon with suspicion by the general practitioner, who had heretofore been silenced if not convinced. Upon close study we find that the gonococcus has the power to penetrate the intact mucous epithelium, and by so doing furnishes the ordinary pus microbes that solution of continuity without which they are powerless. Secondary suppuration takes place and a pus tube results. Even in the peritoneal cavity the gonococcus does not cause greater mischief than pronounced adhesive inflammation similar to bile or iodoform gauze, according to Kelly. If the Fallopian tube be filled with the products of a pure gonorrhœal inflammation no drainage need be secured after removal for fear of a gonorrhœal suppurative peritonitis. We must therefore view gonorrhœa as we would a traumatism or a retained placenta as a condition needing the most careful aseptic management to prevent suppurative infection, with its attendant dangers, and also explains why an active gonorrhœa may complicate an otherwise normal labor without causing a puerperal fever in the mother, although the baby's eyes may not escape damage.

LATENT GONORRHŒA.

This is a condition which at present cannot be explained, but all observers have noticed that under suitable stimuli an apparently cured gonorrhœa will break out, and after months of absence the gonococcus reappear. It is this great resistance and its tendency to hide deeply in the tissues that renders gonorrhœa so obstinate. It has been found in the muscular tissue of the uterus itself, and herein lies the explanation of the clinical views expressed by so many operators, that if pus exists on one side both should be removed, as the other will later almost certainly become affected, and this is undoubtedly true in the majority of cases of pus tubes having their origin in gonorrhœa. The pus microbes may die out, but the gonococci continue to live and furnish grounds for future assault by fresh pus producers, with resulting reinfection of the remaining ovary and tube, and by remaining in the uterus continue at intervals to cause trouble, resisting the curette and iodoform gauze so ardently recommended by Polk, until in final desperation the removal of the uterus

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with the diseased ovaries and tubes has become the popular practice. This mutilation extended to a class of cases in the origin of which gonorrhœa had no part, and became at once unscientific and unsurgical, and has done much to add to the gynæcologists' disrepute.

It must not be forgotten, however, that the great majority of cases of gonorrhœal inflammation recover and remain well. I would not be understood as denying that the gonococcus may under rare conditions produce pus, but this unusual action need not be considered in this discussion.

In the April number of the Johns Hopkins Bulletin, Thayer and Blumer go most thoroughly into the question of gonorrhœal septicæmia. From very late observations they come to the conclusion that the gonococcus is an ordinary pus producer, but within a few weeks I have seen a letter from Williams, also of Hopkins Hospital, who has made a special study of bacteriology in the gynæcological service, and from extensive examination he states that he has been unable to find gonorrhœal pus which did not contain ordinary pyogenic microörganisms. This result has also been arrived at independently by Roswell Park. Even should the gonococcus be the sole cause of some cases of pus in the pelvis, I am convinced that its most important rôle is in allowing the entrance of ordinary pyogenic organisms and giving them a field for work.

PELVIC SUPPURATION FOLLOWING LABOR, ABORTION OR INJURY.

The work of many observers has shown that the vagina may contain a large variety of pathological bacteria, and that the uterine cavity is normally sterile. The germicide action of the vaginal secretions has been definitely proved by Doederlein, and that cultures of pus microbes introduced into the vagina disappear in a short time. This germicide action of the vaginal secretions is greatly increased during pregnancy, and Kronig has shown that at the time of labor the pathogenic microbes are either absent or so attenuated as to be harmless in the majority or cases.

Not less important is the condition of the uterus in regard to the possibility of lodgement of pus microbes. Very early abortion would encounter more active pus producers in the vagina, but would furnish much smaller surface for infection. After the formation of the placenta, a much larger danger of infection is unavoidable, and particularly if the placenta be retained, as it is at once liable to attack by the ever ready vaginal saphrophytes of putrefaction, and later by the pus microbes still present in the vagina. This view of the causation is borne out by the frequency of pelvic suppuration and local peritonitis in abortions at this time. At term the danger from the vaginal microbes, as before stated, is small, but the wound surface open to accidental invasion of pus producers is very large, and the possibilities of systemic poisoning are correspondingly great; general peritonitis being therefore rather more frequent as a result of infection at this time than local suppuration. If we bear in mind a few facts in regard to the common pus producers, the clinical phenomena are explained and a pathological basis may be established.

The great peptonizing power of the staphylococcus tends to the early formation of large single accumulations of pus, while the short life history of the germ quickly limits the process and simple incision and drainage may cure the case.

Reuben Peterson quotes Schauta as saying that fifty per cent. of the cases of pelvic suppuration following labor or abortion are caused by the common pyogenic germs. Here is a scientific explanation of what we have all seen, particularly in rural districts, the self cure of pelvic suppuration through spontaneous opening into the rectum or vagina with future undisturbed pregnancies. This class of infections has also furnished the field of triumph for the advocates of vaginal drainage.

The tendency of the streptococcus to travel along the lymphatics and through the blood current, Cheyne believes due to its long chains becoming mechanically entangled with the corpuscles. This method of invasion and its great power of resistance accounts for some of the more obstinate cases and also for many of the cases of general peritonitis. The amount of pus in pure streptococcus infection is relatively small as compared with the large amount of coagulation necrosis on account of the inefficiency of its toxine as a liquefier of inflammatory products. The colon bacillus is more often a saphrophyte than an obligate parasite, and as a pus producer usually secondary to some more active but shorter lived bacteria. I think it can be shown by accurate observation that multiple abscess and stricture are less common with ordinary pus germs, and the necessity for complete operation correspondingly less than in the gonorrhœal variety. Perhaps an exception should be made in certain forms of streptococcus or secondary colon infection.

Herein lies the difference between the experience of the gynæcologist, doing work in large cities where gonorrhœa is most common, and the country practitioner with whom the ordinary form of pelvic suppuration is most often met with. Two points must always be borne in mind: First, that several forms of pus microbes are usually found. Second, that the microscopical determination of its botanical class gives no idea of the power of infection of a given microbe.

The question as to the advisability of the removal of the uterus in any and every case where the ovaries and tubes are removed, I will not discuss further than to say that my experience coin-

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cides with that of Peterson, who believes that painful symptoms are most frequently in the ovaries, and that the uterus is more commonly the cause of the nervous phenomena. Pelvic cellulitis with suppuration may occur, and cases of this character have been reported by Noble, Penrose and other competent observers. They are usually post puerperal in origin. Rare cases of pelvic suppuration due to the extension by way of the uterine lymphatics were long ago pointed out by August Martin and Winkle, though for a long time denied by Tait, Baldy and those who believed that the exclusive path is by way of the uterus and tubes. Besides the very large class of cases in which the travel of infection is by way of the vagina, uterus and tubes, and the very rare cases in which the lymphatics are the route, there still remains an important class in which the blood is the medium of conveyance of the infection.

The labors of Williams, Cullen and others seem to have established tuberculosis of the ovaries and tubes, and this form of pelvic suppuration is, in the large majority of instances, conveyed in this manner, and the cases of pneumococcus abscess of the ovaries reported by Etheridge undoubtedly belong to this class, although, from a clinical standpoint, there are many reasons for believing that direct infection is not infrequent by the ordinary route.

The rapidity of the diffusion of the peritoneal form of tuberculosis of the ovaries and tubes, even where collections of purulent débris, known as cold abscess exists, usually prevents the radical operation the nature of the case would indicate. Secondary tubercular abscess as a result of disease of the vertebral, sacro-illiac or hip joints may also occur.

THE APPENDIX AS A CAUSE OF PELVIC SUPPURATION.

The close relation which often exists between the right ovary and tube and the appendix has led to considerable confusion. I have operated upon a number of such abscesses, and at least twice have supposed myself dealing with a pus tube until the operation was well advanced. The large variety of bacteria which are turned loose by rupture of the appendix accounts for many peculiar phenomena. The presence of the gas forming bacillus causes the not infrequent presence of gas; while mixtures of pus germs with saphrophytes give rise to a lactic acid fermentation and thin pus, which is not uncommon.

Perivesicular inflammation with intrapelvic abscess, having its origin in infections from the bladder, has been fully dealt with by Hotchkiss in the *Annals of Surgery*, February, 1896. While more common in males it may occur in the female.

THE DIAGNOSIS OF PUS IN THE PELVIS.

By A. W. Abbott, M. D.

Minneapolis.

It is presumed that it is the intention to include under this subject only abscesses arising within the pelvis. Therefore the accidental presence of pus from traumatism, tubercular disease of the bone, or rectal ulceration, for example the abscess of Pott's disease or ischio-rectal abscess, will not be included.

The diagnosis of pus in the pelvis is complicated by two special factors: one, the number of distinct organs in which pus may occur, aud the other the great similarity existing between pelvic abscesses and other abnormal conditions within the pelvis, both in respect of their subjective as well as objective symptoms. These difficulties are increased by the comparative inaccessibility in physical examination.

A typical case of pelvic abscess has a history of sepsis, fever, pain and an immobile, tender and fluctuating tumor. These same symptoms may be present singly or together in other conditions, and, moreover, the entire absence of any or all of them is entirely consistent with the presence of pus. For these reasons it may often be impossible in certain cases to make a diagnosis without an exploratory incision. As illustrating the above, there may be pus, blood, water or a sarcoma in the Fallopian tube, yet pain, tenderness and a fluctuating tumor will be symptoms in each, and fever may or may not be present. Of the above symptoms of pelvic pus, it may be said that in acute cases fever, pain, tenderness and a fluctuating tumor are almost invariably present, while in chronic cases fever, pain and tenderness are not very uncommonly entirely absent. If rupture has occurred spontaneously and fistulæ exist, they are of diagnostic importance according to their anatomical positions.

The conditions most likely to be confounded with pus in the pelvis are hæmatocele, adherent ovarian cysts, including dermoid, ovarian hæmatomata, hydrosalpinx, intraligamentous cysts, sarcomata and soft uterine myomata. The following conditions have been, but are not likely to be mistaken for pelvic abscess: retroflexion of the uterus, floating kidney in the pelvis, pediculated myomata in Douglas' sac.

As pus may be found in the uterus, Fallopian tubes and ovaries, free in the peritoneum, sacculated in the peritoneum, in the broad ligament and in tumors already existing in the pelvis, an accurate anatomical knowledge as well as an experi-

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enced touch are absolutely requisite for determining whether an abscess be within or without any of the pelvic organs.

The diagnosis between the serous exudates and pus is important, as bearing upon the treatment. Serous exudates occur early, are generally more tense and more tender than abscesses.

Pelvic hæmatocele, while accompanied by tenderness, often fever and severe pain, is not usually localized, and generally of wide extent before discovered, frequently reaching above the pelvic brim. I wish to call especial attention to the liverlike edge which generally marks its upper boundary.

Ovarian cyst is not accompanied by fever unless suppurating or having twisted pedicle, in which latter case the agonizing pain and collapse are diagnostic.

A small, suppurating ovarian cyst cannot be diagnosed from a suppurating ovary without an exploratory incision.

Ovarian hæmatomata, occurring as they do in ovaries inflamed and surrounded by adhesions, usually give rise to much pain and tenderness, but rarely exceed the size of a hen's egg. The history is usually one of sudden onset, the pain not being usually preceded by rise of temperature.

Hydrosalpinx is usually not accompanied by much fever nor so much tenderness, nor so much constitutional disturbance and emaciation. The physical signs are practically the same as in pyosalpinx.

Intraligamentous cysts are distinguished by their position, absence of fever and tenderness from abscesses of intraperitoneal origin. The absence of fever and tenderness and of a preceding puerperal condition distinguish them from pelvic cellulitis. To the touch a ligamentous cyst is well defined and resilient, while cellulitis is boardlike or boggy and diffuse. The intraligamentous cyst is generally unilateral.

The reposition of a retroflected uterus or floating kidney, and the great mobility of the pediculated fibroid, should render the diagnosis generally easy, although it must be borne in mind that pelvic abscess may exist with any of these conditions.

Sarcomata have no previous history of inflammation, are not usually so painful, and are generally confined to the body of the uterus. The soft, fluctuating feel has undoubtedly given rise to the mistake when it has occurred.

As regards fever, while it is almost invariably present, especially in acute cases, where it may reach 104° to 105° F., in chronic cases it may be entirely absent. I have watched a case for two months with almost daily observation, found the temperature normal throughout, and yet evacuated at the end of that time six ounces of pus from a suppurating ovary. I have watched a case of double ovarian abscess for two weeks without rise of temperature before operation. Indeed, it is not a very uncommon experience to find pus at the time of operation when it was not expected on account of the absence of fever. I believe that this occurs in those cases where the pus has become sterile. In the case of double ovarian abscess just mentioned no bacteria were found in the pus or in the tissues adjacent, and no cultures could be grown.

In regard to the pain, while a very prominent symptom in acute cases, it is very often more a sense of discomfort and uneasiness in chronic cases.

The immobility, tenderness and fluctuation are so commonly present in other conditions, as we have seen, that they are more important as concomitant rather than as diagnostic symptoms.

Fistulæ from spontaneously ruptured abscesses may be of great importance as diagnostic means. For example, I was able, with Kelley's endoscope, to find in the bladder the opening of an abscess which had existed for years, and had been treated as a case of chronic cystitis. The drainage being free, the abscess was very flat, empty, and felt like the thickened bladder wall. From the fact that the fistulous opening from the pelvic abscess breaking into the bowel is usually in the sigmoid or high up in the rectum, the exploration of the fistula by the bowel is frequently impossible. The fistula can, however, when low down, be entered by the sound if the rectum is well exposed by the Sim's or knee chest positions. It must be borne in mind when searching for these openings in the rectum that they frequently occur upon the sacral side from deep burrowing, and hence the inspection must not be confined to the point nearest the abscess.

I wish to protest against the use of the aspirator as a means of diagnosis. It is the most free from danger when used in Douglas' cul de sac for an abscess pointing in that locality. The dangers in aspiration through the abdominal wall or at the lateral sides of the pelvis are infinitely greater, on account of wounding intestine, ovaries, tubes, bladder, or opening some of the large veins in the broad ligament, than are vaginal incisions large enough for the exploring finger.

21 South Tenth Street.

PROGNOSIS OF PUS IN THE PELVIS.

By F. A. Dunsmoor, M. D.

Minneapolis.

The prognosis of pus in the pelvis depends on (*a*) source, manner and nature of infection; (*b*) location and structures involved; (*c*) extent of

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damage already present; (*d*) whether already discharging externally or through the bladder, uterus or rectum; (*e*) whether draining sufficiently; and (*f*) manner of treatment.

We take it for granted that this symposium, being under the department of gynæcology, does not take into consideration those purulent accumulations which result from diseases common to both sexes, like appendicitis, ischio-rectal abscesses, psoas abscesses, tuberculous products or results of malignant diseases.

If the pus is within the Fallopian tubes, with the fimbriated extremities sealed and the uterine ostium patent, and no complications, experience has shown that many of these cases go on to a complete and satisfactory recovery at an early period after the infection, whether pus is due to specific or puerperal poisoning.

The clinical history which precedes our prognosis probably associates with pyosalpinx, a very common extension of the disease through the fimbriated extremity to the ovary, and, possibly, to the peritoneal cavity, in which case, whether due to either source, the prognosis is necessarily very grave. For each additional organ beyond the Fallopian tube, which becomes involved by simple extension of the inflammation and infection from the germs causing the original inflammation of the tube, there is an increase in the gravity of the prognosis; and because of the greater facilities with which the germs reach the peritoneal cavity, and, indeed, the cellular tissue about the ovary and rectum in the puerperal state, those infections which follow are the worst.

It is well known that there are cases of infection due to gonorrhœal poison which are ofttimes well borne for a number of years, and that, when large accumulations of such pus are within the Fallopian tube, and have remained sealed within its cavity for a long time, the dangerous element disappears with the life of the specific germ, and this pus may afterward meet the peritoneal surface by rupture of the sac as a result of operative interference, or by reason of accidental external violence, or because of the inflammatory product extending through the walls of the tube, without disastrous results.

In any case, we should, however, be guarded as to certifying that an actual cure has taken place, because it is quite possible that, as a result of the disappearance of the purulent secretion, either one or both of the extremities of the tube may be sealed, or, indeed, any portion of the canal itself may be obliterated by adhesions, on one or both sides, thus producing sterility. The woman is, of course, also sterile so long as there is an accumulation of pus in each tube.

Those cases in which the pus has extended, in the early stages beyond the limits of the Fallopian tubes, beyond or through the ovarian structure into the cellular tissue about these organs, usually result in sinuses which communicate with the bladder, or rectum, or vagina, producing a condition of sapræmia and lifelong invalidism, almost beyond the ability of the surgeon to mitigate, control or cure.

The outlet for these sinuses is not confined to those above mentioned, because the pus has burrowed through the connective tissue to the diaphragm, ruptured into the lung; it has followed the course of the vessels of the thigh and discharged near the knee; it may escape from any of the openings of the pelvis. Meeting such a case, we must add to our prognosis as to the final termination, the extreme probability of suffering, not only pain, but the mortification which arises from the odors which are the results of the mixture of the original purulent secretions with that of the cavities through which they escape.

Again, the poison may escape directly from the fimbriated extremity in such amount as to preclude the possibility of nature's establishing defending walls between the peritoneum and the source of infection, developing peritonitis, which immediately overwhelms the patient with the extent and virulence of its poisoning, death rapidly ensuing.

It is also true that in cases which appear to fully recover, by reason of the discharge of pus through the uterine canal, or by any other outlet, there are recurrences or relapses of equal severity with the original invasion, without any new infection from other sources than that supplied by the site of the former fields of inflammation.

The inexperienced physician will ofttimes make favorable prognosis, where it appears that there is a temporary relief of all the urgent symptoms, and an apparent benefit to the patient's condition, because these collections of pus discharge through the sinuses previously mentioned, while, as a matter of fact, the patient was in a more satisfactory condition to the surgeon before this discharge took place, if it occurred through any other opening than the vagina.

When pus is found in the ovary and any of the pelvic cellular tissue the prognosis is invariably bad, unless the disease be completely removed by surgical procedures. If large collections of pus have been present in any of the pelvic structures, and have contaminated or ramified through the cellular tissue, and have destroyed the integrity of the different organs of the pelvis, such as the tubes, ovaries, broad ligaments, portions of the vesical or rectal walls, and at the time of examination, no pus be present, the prognosis must still stand that invalidism, pain and sterility are the probable lot of the patient.

Where the pus in the pelvis has been in large or small quantities, and sufficient drainage be present to prevent reaccumulation, the patient may continue to exist in comparative comfort; but, until the site of the original sac of pus and its sinuses

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are removed, there is a standing menace to the life of the patient. Those collections of pus which have been liberated early and allowed to discharge through the vagina, are usually cured satisfactorily by such procedure. All other cases, which have become chronic in their nature, if they involve the ovarian structure or any of the cellular tissue, will probably not be cured by drainage, but the entire field of the disease must be removed by surgical procedure. There must be at least a local peritonitis in all cases, and a probable displacement, with adhesions of the ovary, tube, uterus and possibly of the ureter, remaining in cases after the pus has disappeared.

Finally, all collections of pus within the broad ligament have a grave prognosis.

THE TREATMENT OF PUS IN THE PELVIS.

By Archibald MacLaren, M. D.

St. Paul.

The treatment of accumulations of pus in the pelvis should follow the same general rules as govern us in the treatment of pus in other parts of the body, *i. e.*, to open and drain the abscess at its most dependent point, if possible, removing the abscess sac if necessary to prevent protracted suppuration.

Bacteriological investigation has shown that pus confined in a closed sac usually becomes sterile, so that it is often possible to inoculate the healthy peritoneum with such pus without producing a fatal peritonitis. As it is impossible, however, clinically to distinguish between a sterile and a virulent abscess, we should treat them all as though they were of a virulent character.

The treatment of pelvic abscess has passed through four distinct stages within the personal experience of the writer. When I was a student and a hospital interne, pelvic abscesses were all either aspirated or incised through the vagina or the lower anterior abdominal wall. About this same time the teachings of Tait led us to attack pelvic accumulations of pus from above, opening the peritoneal cavity and removing the pus tube or suppurating ovarian cyst, and draining through the abdominal incision.

Some three years ago the French school of surgery suggested vaginal hysterectomy in bilateral pelvic suppuration. This school was led by Pean, of Paris, and ably seconded by Jacobs, of Brussels. Then last comes the American school, led by Henrotin, of Chicago, who advises a return to vaginal section and drainage. Taking up these methods in detail, we notice that the prime reason for the almost total abandoning of the old vaginal operation, lay in the erroneous theory regarding the pathology of pelvic suppuration. Believing, as we all did thirteen years ago, that pelvic abscess was due to suppuration of the connective tissue, we would naturally try to reach the pus through the vagina, and not through the peritoneal cavity.

Many very unsatisfactory and many fatal results followed the old operation, because the abscesses were blindly aspirated or incised through the vagina, injuring the pelvic viscera, and so producing fatal peritonitis. Another reason for these bad results lay in the opening of only one pocket or compartment of these abscesses, which are often multilocular. I was very much surprised to see such a very excellent surgeon as Senn recently advise the use of the aspirator in the treatment of pelvic abscess, for I am sure that most of you will agree with me that the aspirating needle is a dangerous instrument to use in the pelvis.

When we had become convinced, through the medium of clinical and post mortem examinations, that the theory of Burnutz regarding pelvic suppuration was correct, and that ninety-nine per cent. of all pelvic abscesses arose from intraperitoneal inflammations, our method of attack necessarily changed.

The fear of leaving the "ulcerating stump of a Fallopian tube or diseased ovary" at the bottom of a vaginal sinus to keep up a prolonged suppuration, led us to try to remove the diseased appendages entire. There is no question that this was a decided step in the right direction, but it is heroic surgery, and it is accompanied by a high mortality, even in the hands of skilled operators. In Roosevelt Hospital, in the last six months of 1894, the mortality was over forty per cent. in such cases. In the Woman's Hospital of New York, in the year 1895, there were forty-five cases of pelvic suppuration including pyosalpinx and suppurating ovarians, treated by abdominal section; eleven of these operations being hysterectomies. Out of this number there were fourteen deaths, giving a mortality of thirty-one per cent., as taken from the annual report. Between the fifth of March, 1890, and the seventeenth of December, 1892, Dr. Howard Kelly operated upon 511 abdominal cases at the Johns Hopkins Hospital in Baltimore. Sixty-six of these operations were for the removal, by cœliotomy, of pus tubes or suppurating ovarians, with ten deaths, or a mortality of fifteen per cent. Twenty-eight of these cases were for the removal of suppurating ovarians or ovarian abscesses, with eight deaths, making a mortality in this class of cases of twenty-eight and five-tenths per cent. [Johns Hopkins Hospital Reports, 1894].

The intraabdominal operation is objectionable for several reasons: First, because the free peritoneal cavity is opened and inoculated with pus;

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I examined her, and found a small, movable uterus; on its right a hard nodule the size of a hen's egg. This patient has no pelvic pain, and is, to all appearances, perfectly cured.

Case No. 4. Mrs. W.; seen with Dr. Park Ritchie, of St Paul. When first seen this patient had just been delivered by Dr. Ritchie of a six months' fœtus. This delivery was immediately followed by a very acute attack of pelvic peritonitis, due, as we believed, to the rupture of an old pus tube. On December 3, 1895, I opened a large, intraperitoneal pelvic abscess, which contained at least two pints of very offensive pus. This patient's recovery was somewhat tedious, but her condition is now excellent. I have not included this last case in my list of suppurating ovarians, mentioned in the earlier part of this paper; neither have I included the next case, which had a fatal termination after a general septic peritonitis.

Case No. 5. Mrs. G. G. D, Dr. Albert Senkler's patient, was twenty-one years of age; had been married five months. She had suffered previously from what was supposed to be an attack of appendicitis three years ago. She is now convalescing from an attack of typhoid. She was first seen on the evening of March 9, 1896. At this time she was in a collapse, with a pulse of 160 and a temperature of 105°. She was suffering from constant vomiting and universal distension of the entire abdominal cavity. On the eleventh of March I made a vaginal section and opened a large, very offensive intraperitoneal abscess. The vomiting steadily continued, the pulse grew weaker, and the patient died in eight hours from the septic peritonitis, having experienced no relief from the opening of one of what I believe to be the many encysted accumulations of pus.

Case No. 6. Mrs. H., sent to me by Dr. K. McDowell, of Staples, Minn. Patient was twenty-one years old; married about two years; no children, no miscarriages. Patient has been sick for many months with pelvic pain and hectic symptoms. Through a vaginal incision I opened a large suppurating ovarian cyst of the left side containing one pint of thick offensive pus. This operation was performed at St. Luke's Hospital on the fourth day of January, 1896. Being desirous at this time to remove the sac of the abscess I opened the abdominal cavity, but finding that the adhesions to the cyst were so dense that it could not be removed without great damage, I closed the wound without attempting to remove the tumor. This patient made an excellent recovery, left the hospital at the end of the month; has since been reported as cured by her attending physician.

Case No. 7. Mrs. D. G. A., of Butte, Montana, sent to me by Dr. Kean, of St. Paul. Patient thirty years old; married five years; no children, no miscarriage. Operated upon at St. Luke's Hospital on the thirtieth of December, 1895. She had been curetted two and a half months ago. Opening Douglas' cul de sac I found an intraperitoneal abscess of four ounces, and above this a suppurating ovarian cyst containing a quart of pus. No trouble was apparent in the other appendage at this time. On the twenty-second of January I again etherized this patient, removed the drainage tube from the left side, found a cavity as large as a pigeon's egg about the end of the tube. This cavity was packed with gauze. At the same time I found an ovarian abscess upon the right side as large as a Florida orange, which was opened and drained. I last examined this patient on the sixteenth of March; she had gained seven pounds since last operation, was suffering from no pain whatever, but upon careful examination I found upon the right of the pelvis a unilocular cyst of the ovary as large as a fœtal head. I advised the removal of this cyst, but as yet she has not consented to the operation.

Case No. 8. Mrs. Jos. K., sent to me by Dr. O. A. Beal, of West St. Paul. Patient is twenty-one years old; has had three children; the last one was delivered by a midwife six weeks ago. I operated upon this patient at the City Hospital on the ninth of February, 1896, finding two suppurating ovarian cysts, the left containing a pint and a half of thick, creamy, odorless pus. Each abscess cavity was drained with a rubber drainage tube. This patient was extremely weak, thin and emaciated, in the worst possible condition for any surgical operation. She made an excellent recovery, having no set back whatever.

THE DIAGNOSIS OF UTERINE FIBROIDS.

By C. A. Stewart, M. D.

Duluth.

The diagnosis of uterine fibroids depends upon three factors: (1) the history of the patient; (2) the general symptoms developed by the disease; and (3) the information afforded by local examination of the patient.

In the major number of cases met in practice there should be corroborative evidence given by all three to make the diagnosis at all positive.

Consideration must be given to the history of the patient and her disease on account of the presumptive information it may afford, as experience has shown the disease to be one of slow development, months and even years sometimes elapsing before the diseased condition, whose existence has been recognized, becomes a direct menace to life.

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It has been noted that the development of fibroid growths in the uterus occur, other things being equal, more often in the unmarried or in the married and nulliparous woman than among those who have borne children, the comparative immunity of the latter being probably due to the nutritive changes which occur as the result of pregnancy and parturition with the functional rest which ensues during the period of lactation.

The influence of race also appears to exert an influence in its causation, it being much more frequently found in negroes than in other races. Having these points in reference to the manner of its evolution and the character of the patient whom it more commonly effects we briefly review the general symptoms which attend the development of these growths; we find the majority of them to be common to most of the diseases of the uterus and adnexa, although in this as in most of the others, some one or two symptoms appear so regularly and assume such prominence as to give them the character of distinctiveness.

In fibroma this distinctive symptom is hemorrhage, and while neither menorrhagia nor metrorrhagia is by any means a pathognomic symptom, the occurrence of either is sufficient, when the history of the patient and her disease serve as corroborative factors to warrant a strong presumption of the existence of a tumor, and to demand a thorough exploration of the pelvic cavity.

As an aid in fixing the diagnostic points, which are shown by local examination, we divide uterine fibroids into three classes according to their location: (1) those which develop under or very near the endometrial mucous membrane, or the submucous fibroids; (2) those which are imbedded in the muscular tissue of the organ, the interstitial variety; and (3) those which pursue their evolution toward and to the peritoneal surface of the organ, the subperitoneal form of the disease. This division being purely arbitrary, it may be well to state that several tumors may coëxist and that it is possible to find examples of any two or all three forms present in the same patient at one time. One symptom almost invariably noted is augmentation in the size of the uterus and elongation of its cavity.

The interstitial variety are smallish in size, continued growth being attended by its evolution toward either the external surface of the organ or its cavity, with the ultimate result of placing it in one of the other classes.

When the tumor is small and interstitial the difficulty in diagnosis is often very considerable, it being necessary to differentinate between it and hemorrhagic metritis, early pregnancy with persistence and perhaps perversion of menstruation, uterine subinvolution, cancer of the body of the organ, and ante- and retro-deviations, all which conditions may be attended by more or less bleeding; and there may also be enlargement of the uterus and deviation from the normal position of the organ in the pelvis.

In these cases the history of the patient is of especial value in affording confirmatory information. The search for the tumor should be by bimanual palpation and the rectal touch, and it is always desirable to compare the results made during menstruation with those obtained during the interval, as the latter alone may prove deceptive.

In difficult and doubtful cases it is the proper procedure to anæsthetize the patient and dilate or incise the cervix in order to thoroughly explore the uterine canal. Should this be done, scrupulous care should be taken to render the procedure absolutely aseptic in all its details. If, after this procedure, the nature of the trouble is still doubtful, the scrapings secured by the use of the curette may afford some information if they are subjected to microscopical analysis.

In submucous fibroma hemorrhage is a more prominent symptom than in the interstitial variety, and in this form the diagnosis is often easily made.

The tumor may be attached to the external os or to the cervical canal, when it is appreciable to the sense and touch, and care need only he taken to distinguish it from uterine inversion; careful examination, however, will demonstrate both lips of the os, and bimanual palpation shows the body of the uterus in its proper position. If the tumor is attached to the cavity of the body or at the fundus its existence can generally be ascertained by the touch, especially during hemorrhage, as then the walls of the organ are more soft and the os more patulous so that it will generally admit the examining finger, detecting an obstruction in the uterine cavity which is flattened and distorted laterally.

Externally the uterus is globular in form, resembling its appearance in the early months of pregnancy, but the local examination, the hemorrhage and the history should clear away all doubts as to the condition.

The submucous fibroid may have its attachment by a pedicle which allows it to extrude into the vagina or even from the vulva; it then may become greatly augmented in size and undergo inflammatory or degenerative change with ulceration or sloughing of the surface, which with the attending sanious and offensive discharge adds greatly to the difficulty of diagnosis.

The tumors which grow from the external surface of the uterus into the abdominal cavity are less liable to be attended with disturbance of uterine function than are either the interstitial or submucous forms. The most common symptoms are those of irritation or of mechanical pressure upon adjacent organs, such as neuralgic pain, vesical irritation, derangement of the bowels, etc., with probably evidence of displacement of the organs.

Conjoined manipulation will generally allow the

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character of the growth to be determined, especially if its attachment to the uterus be close and by a large base; if, on the contrary, the tumor be attached by a long, narrow pedicle and be œdematous in character, it might be mistaken for an ovarian cyst; or a tumor of the proper size with a long and narrow pedicle may closely simulate a floating kidney. If the evolution is between the folds of the broad ligament the extra pressure to which it is subjected crowds it into the unoccupied space in the pelvic cavity, with the result of developing serious pressure symptoms, such as dysuria and retention of urine, pain from pressure upon the nerve trunks, etc. The uterus is often raised high in the pelvis. Other conditions which may cause similiar symptoms and at the same time present many of the same local characteristics are pelvic hæmatocele, inflammatory foci in the broad ligaments and encysted collections in the tubes.

The main points in diagnosis are the differences in consistency and sensitiveness of the tumors; the fibroid being firm to the touch and free from tenderness, while a hæmatocele or encysted tubes would be boggy and fluctuating, and both these and inflammatory areas would show tenderness upon pressure.

Here again careful scrutiny of the history afforded will clear away many doubtful points in the diagnosis, which otherwise would necessarily remained unsolved.

THE PATHOLOGY AND SYMPTOMATOLOGY OF FIBROID TUMORS OF THE UTERUS.

By J. L. Rothrock, M. D.

St. Paul.

Probably no condition which confronts the gynæcologist of today is frought with so much intesest as fibroid tumors of the uterus. The great frequency with which they are met, together with the many forms they assume and the multiplex symptoms they occasion, have, during the last two decades, called for more than ordinary attention on the part of the profession in devising means for their management.

Formerly they were regarded as innocent growths, which at their worst could do no harm further than the pressure symptoms they occasioned when they reached large size, or by the hemorrhage they sometimes gave rise to; a class of tumors benign in character and that would cease to be troublesome after the menopause. Such was the favorable view held by older writers, and it is only after a careful study of the pathological features of a large number of cases, made possible by modern operative methods, that we have discovered that these tumors are by no means the innocent, harmless growths they were once thought, but are often mischievous, a constant menace, and not infrequently they become a source of real danger to life.

These tumors have been variously designated as myoma, fibroma, and fibro-myoma. Strictly speaking, from their origin, they ought to be classed as myoma, growing as they do from muscular tissue.

However, were we to adopt a name in strict accord with their anatomical structure, they would, in a majority of instances, be called fibro-myoma, as pure myoma or pure fibroma is rare, the two elements, muscular and fibrous tissue, being usually found in combination, the one or the other predominating.

While these tumors are primarily interstitial their character is subsequently determined by their size and position. For example, they grow in the direction of least resistance, pushing before them the tissues, forming for themselves a bed. If by chance they originate near the uterine cavity, they will naturally become submucous. If, on the contrary, they happen to be located near the peritoneum, they become subperitoneal. On the other hand they may remain firmly embedded in the muscular wall of the uterus, when they are properly termed interstitial.

These growths may be single or multiple, and may grow in any part of the uterus. The softer tumors usually grow in the fundus of the uterus, and are rarely multiple. Their consistency depends upon their structure and blood supply. The majority spring from the posterior wall of the uterus, and they are next frequently met with in the anterior wall, and least frequently in the cervix.

According to Schroeder ninety-two per cent. originate in the body, while only eight per cent. are met in the cervix. As to their variety, according to Winkel, sixty-five per cent. are interstitial, twenty-five per cent. subperitoneal and ten per cent. submucous.

As regards their size, they vary much, from a mere nodule, the size of a hazelnut, to many pounds in weight.

Their growth is generally slow, and depends upon their anatomical structure. For example, when they contain much fibrous tissue their growth will be correspondingly slower than if they consist largely of myomatous tissue. The growth depends also upon the blood supply, as, for example, when pregnancy complicates, the increased blood supply incident to this condition often occasions a very rapid growth.

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Fibroid tumors of the uterus are subject to many pathological changes, which should be borne in mind, since the complications which they occasion call for frequent modifications in their management.

They may be attacked by inflammation, which may terminate in gangrene or suppuration. There has been some doubt in the minds of authors as to whether a true inflammation of the tumor proper ever occurs. In case of necrosis there is often met a zone of inflammatory reaction about the necrotic area. According to Gusserow other forms do not exist, and he believes that active hyperæmia or œdematous swelling at the time of menstruation has been mistaken for inflammation.

On the other hand, inflammation in the capsule is not so uncommon, and may result from the introduction of infection through trauma. Suppuration may occur if infection takes place, and large quantities of pus are sometimes met with, the tumor substance seeming to melt before the infection.

Subperitoneal inflammation is nothing more nor less than a localized peritonitis, which is not to be classed as an inflammation of the tumor itself. Suppuration is especially prone to happen in the puerperium, and several cases are on record in which the tumor has disappeared, the pus having discharged into the uterine cavity.

Necrosis is a condition the result of disturbance in nutrition, as the sudden cutting off of the blood supply, or from infection by pathogenic bacteria. Microscopic examination shows nothing specially characteristic, the cellular elements having become fatty appear as a turbid, decomposed mass.

True fatty degeneration is uncommonly rare, and has been doubted. If it occurs at all it is most probably met in child-bed, following the analogy of involution of the uterus after confinement through a fatty degeneration of its muscular elements. Indeed Virchow and Spiegelberg have observed that only the muscular elements undergo degeneration, while the fibrous elements remain. Were the tumor pure myoma it might entirely disappear.

Induration or atrophy occurs chiefly at the menopause; the muscular elements being removed by fatty degeneration the fibrous tissue shrinks and atrophies, so that a variety of cirrhosis results. Now a further step in the retrograde process is the deposition of lime salts, and we have calcification, a condition frequently met with.

Fibroid tumors not infrequently become cystic, and in the majority of instances these so-called cysts or spaces are dilated lymph spaces and contain clear fluid. On the other hand, occasionally a cyst is met, the wall of which is lined by columnar epithelial cells, and different theories have been advanced in explanation, most plausible of which are that the prolongation of a gland from the uterine mucous membrane has been caught up and incorporated into the growth, while others believe that in rare instances they may originate in the remains of Gärtner's canals. In rare instances the blood channels in the tumor become markedly dilated, thus creating a variety of blood cyst.

Endometritis almost invariably accompanies fibroids, and is the chief factor in the causation of the hemorrhage. Not infrequently salpingitis, pyosalpinx and hydrosalphinx may accompany fibroids, a beautiful illustration of the latter having been observed by me during the last year.

These inflammatory conditions of the mucous membrane are the result of mechanical hyperæmia as well as of chronic inflammation, the result of irritation of the tumor or as the sequelæ of an infectious endometritis. Much reference has been made in recent years by certain writers to maglinant degeneration of fibroid tumors. Although fibroma may exist in the same uterus with carcinoma, no observation has been made of a fibroid tumor becoming carcinomatous. In those cases in which carcinoma is associated with fibroid tumors it invariably has its origin in the diseased endometrium, afterwards infiltrating the tumor, or in the columnar epithelial cells lining cyst walls in rare instances.

Much more rational is it to speak of sarcomatous degeneration, for the fibroid tumor invariably contains the essential elements from which this neoplasm grows, and many undoubted cases of this nature have been reported.

It is but natural that a growth capable of such varying conditions, both as regards its anatomy and pathology, should give rise to a multiplicity of symptoms.

Small tumors when they are enclosed in the wall of the uterus may give rise to few objective symptoms, most prominent of which are pain and weight in the abdomen. In addition, there may be present headache, especially at the time of menstruation, cardialgia and pains in the chest. As soon as the tumor grows larger there is stretching of its bed, which occasions among the earlier symptoms dysmenorrhœa. If the tumor is interstitial, with its increase in size, owing to the irritation and increased blood surplus, a fungus endometritis ensues, which gives rise to menorrhagia and even severe hemorrhage.

Occasionally quite small tumors give rise to severe hemorrhage, especially if submucous.

As the tumor increases in size, pressure symptoms follow which depend upon the location and size of the tumor. If located in the posterior wall of the uterus, retroflexion simulating that of a gavid uterus sometimes occasions troublesome symptoms, especially during the menstrual periods.

Tumors developing in the broad ligaments may dislocate the ureter and occasion hydroureter and hydronephrosis at a comparatively early stage of the growth, and this becomes an almost constant

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condition when the tumor becomes large enough to block the pelvis, especially when situated low down in the uterus.

Pressure on the rectum when the tumor reaches large size may cause troublesome constipation. In not a few instances pressure on the nerve trunks occasions troublesome crural neuralgia. More disastrous is pressure on the hypogastric and iliac veins, since it may occasion thrombosis with subsequent œdema or embolism. Submucous tumors cause colicky pains at menstruation, especially if polypoid.

The changes in the condition of the uterine wall and its lining in many instances produce sterility.

Olshausen observed that in a few cases the sterility preceded the development of the tumor.

The late Prof. Goodell (my former teacher) was accustomed to say that he had observed that if a woman did not give birth to children she was likely to bring forth tumors. It should be borne in mind that the possibility of pregnancy complicating a fibroid tumor is never precluded, pregnancy having occurred after a long continued period of apparent sterility.

Menorrhagia may render the patient anæmic, but in spite of repeated hemorrhages it rarely proves fatal.

The high grade anæmia which it occasions, however, if long continued, gives rise to fatty degeneration of the heart and liver, often with very serious consequences, producing symptoms of irregular pulse, shortness of breath, œdema, etc., rendering the patient particularly subject to intercurrent affections which often prove fatal. In rare instances sudden death may occur from embolism of the pulmonary artery similar to that at child birth. Occasionally fatal peritonitis terminates the suffering of our patients from sudden softening and the escape of the contents of a suppurating fibroid into the peritoneal cavity.

Should pregnancy occur, complicating a fibroid tumor, the chief symptom is pain after the pregnancy has advanced to some extent, which is believed to be due to interference with the intermittent uterine contractions.

Having thus rather briefly reviewed a few of the more essential points of this subject, it will be seen that it presents almost unlimited field for reasearch, not only to the pathologist, but to the practitioner who is called upon to manage this disease.

JUDICIOUS VERSUS INDISCRIMINATE UTERINE GAUZE INSERTION.

By John H. Rishmiller, M. D.

Member of the Alumni Association of the Woman's Hospital in the State of New York; Late House Physician of the German Hospital, New York City; etc.

Minneapolis.

In a conversation with Dr. Henry C. Coe concerning the use of gauze in the genital canal in women, he was so convincing in his ideas that since I have lost no opportunity of investigating this subject. I wish to consider gauze as utilized, first, as a uterine drain, and, second, as a uterine tampon; its judicious and injudicious employment, and the effect we may expect directly or indirectly from its use.

For drainage to be effectual it must afford a ready exit for the secreted material and so prevent reabsorption. Many operators invariably tampon the uterine cavity with gauze, and some perform the identical process with the cervical canal, while others simply insert a narrow strip reaching into the uterine cavity and protruding from the external os by several inches, but how many are contented without gauze insertion? None if it were always accessible. Our German confrères in a measure have discarded gauze introduction into the uterine cavity subsequent to curettement, and it seems to me the ideal and most rational process. I am firmly convinced of the fallacy of packing the uterine cavity in aseptic cases that have no functional disturbances. Most of my observation has been at the Woman's Hospital, New York City, and I invariably have noticed a gradual rise of temperature after thirty-six or forty-eight hours, no matter how scrupulously antiseptic our work was executed, or how aseptic the cases we were dealing with. Experience has demonstrated that *the average temperature after curettage is lower without than with gauze packing.* Why, therefore, are we tamponing so promiscuously without more forethought?

It is not my purpose to decry the invaluable therapeutic agent, *gadze*, but on the contrary do maintain that it is indispensable in all forms of surgery, provided we employ it discriminately and not mechanically or in a routine fashion. Permit me to ask a question: Why do we tampon the uterine cavity and canal and speak of it as uterine drainage? In tamponing, the uterus is stimulated to contraction, which ultimately wedges the gauze into the internal os and thereby dams back the

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secretions. The wedge of gauze, if I may term it such, is always covered with a thick, tenacious mucus tinged with blood, and resembles uterine catarrh secretion. This gummy mucus is the result of uterine irritation and inflammation kindled by the presence of a foreign body. On examining the gauze after its extraction we readily distinguish between the part which has been in contact with the uterine walls and that which has been in the interior of the tampon. As the meshes are thus occluded it is evident that no drainage can percolate through the gauze, and whatever secretion exudes from the cervical canal escapes between the walls of the uterus and the ball of gauze. Now, imagine a uterus tamponed for thirty-six hours, or longer, the upper space of the corpus uteri occupied by mucus or septic matter, as the case may be; on uterine contraction this fluid seeks the place of least resistance, and what is the issue? It is forced into the Fallopian tubes, lymphatic sinuses, blood vessels, etc. If we are treating a pure aseptic case no bad results can follow; but suppose we have a septic or our antiseptic technique has been imperfect, then we can aptly comprehend how a rise of temperature is produced. Many patients have developed after curettage salpingitis and pyo-salpinx, which has been erroneously attributed to the improper use of the curette. This is an absurdity. It was produced by indiscreet tamponade of the uterus, thus hindering the egress of secretions through the natural passage and favoring the unnatural, viz: the ostium uterinum. In puerperal cases it is even more imperative to bear this in mind, because we are encountering enlarged Fallopian tubes, sinuses, etc. The less we tampon in septic puerperal cases the more tubes will be saved the necessity of ablation. *More cases of pyo-salpinx are produced from the injudicious tamponing of the uterine cavity than from the use of the curette.*

It has been maintained that the uterine canal is held patulous by the gauze, and permits egress of the secretions. This is fallacious; on the contrary, the os is plugged with the gauze. This fact I have demonstrated over and over again, and the same must be true with your observations. For instance, on inserting a speculum and then withdrawing the gauze, we always observe a gush of mucus, septic or non-septic, coming from the cervical canal. Serum will always drain from the uterine cavity, no matter whether drainage or no drainage, but the cases that validate or invalidate tamponade are the septic, both the puerperal and non-puerperal. In the former we frequently observe fragments of decidual membrane, sloughing tissue, fœtal débris, etc., expelled subsequent to the gauze extraction. Another circumstance to verify that the uterine cavity and canal is a better drain without than with gauze is confirmed clinically; on extracting the gauze after curettage where a rise of temperature has been observed the fever will, as a rule, immediately abate. We have no better drain than the cilia, and by packing we impede their ciliary current.

In puerperal sepsis with retained effete material, emptying the uterus thoroughly and following with a tepid antiseptic irrigation, loose insertion of gauze into the uterus which is to be extracted in six to eight hours, favors the removal of débris by adhering to the gauze. The longer we allow the gauze to remain the more it loses its usefulness as a drainage by the interstices being occupied and blocked by a fibrinous deposit and cast off cells—the gauze acting like a filter. Too strong germicidal solutions for irrigation act as a caustic, and produce suppuration, which serves as a culture medium for the unremoved germs, some of which remain, no matter how thoroughly we accomplish our work. If we accept the hypothesis that "the endometrium is not a mucous membrane but is a lymphoid structure lining an embryonic organ," then we are considering structures which possess vital absorptive properties far more active than any mucous lining in the body. These lymphoid structures of the uterus are directly continuous with the innumerable lymph channels between the layers of the broad ligaments, and thus septic virus easily enters the portals of the general system. I wish to emphasize the using of *tepid* instead of hot uterine irrigation in all septic cases, for the reason that the capillaries and sinuses in the uterus are loaded with septic matter, and hot irrigation will cause these to contract—thus forcing the poison into the system, and hence the invariable chill following such a procedure. On the other hand, a tepid irrigation will dilate the mouths of the capillaries, sinuses, etc., thereby promoting the emptying of the virus into the uterine cavity. This is accompanied by a slight bloody coloration of the irrigating fluid and a decrease of all septic symptoms.

Another too frequent employment of gauze is in the repair of lacerated cervices. The originator of trachelorrhaphy, Dr. Thomas Addis Emmet, whom I assisted for one year and a half, did not in a single instance use uterine gauze introduction after the repair of a lacerated cervix. In fact it was condemned *in toto*. We encounter lacerations which have been productive of the fungosities and catarrhal inflammation of the uterine mucous membrane. Here dilatation and curettage prior to trachelorrhaphy is absolutely essential for a cure. It is claimed that a strip of gauze in the cervical canal will keep the denuded surfaces separated, if overlapping, and prevents coaptation and union. We need not fear occlusion, provided we have left a central line of undenuded mucous membrane. It is unquestionably difficult to retain the gauze exactly on this central line, furthermore, the extraction will more or less disturb the parts in apposition.

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I disapprove of gauze introduction into the uterus after curettement for gonorrhœal endometritis on the principle enunciated that it is a prolific cause of py-osalpinx. An antiseptic vaginal dressing is highly commendable for the purpose of keeping the rugosities separated and serving as a surgical dressing.

I have directed your attention to the evil of using gauze without forethought, but now let me merely mention the maladies where firm uterine tamponade is destined to produce marvelous results. In sterility, depending upon flexion of the uterus where the lumen of the cervical canal is narrowed and bent on itself or tortuous, accompanied by dysmenorrhœa and other functional disturbances, thorough tamponade after dilatation of the cervical canal and curettage of the corpus uteri, will uniformly be followed by unusual amelioration of all symptoms, and in some cases absolute cures. The cervical canal should, in all instances, where we are seeking to keep the canal patulous, be tamponed as thoroughly as the uterus. If this is neglected, in even the minutest detail, we are not accomplishing our desired object. The gauze should be left *in situ* for a week or as long as the temperature will permit. Tamponade is invaluable in uterine hemorrhage, when the muscular walls are flabby and inert, serving as a stimulus and causing the uterus to contract for the expulsion of the foreign body. Intra-uterine fibromata may be encouraged to enter the cervical canal by frequent repeated uterine tamponing, and ultimately require excision. In some cases with sluggish circulation of the pelvic viscera a thorough tamponade will tone up the vessels and enhance their emptying. The absorption of parametritic exudation is favored by thorough tamponade; likewise phlegmatic nodulations in the broad ligaments and boggy congestions immediately involving the surrounding structures of the uterus are much relieved by uterine packing.

Operators are at variance as to what gauze is the best and how it should be prepared. They are as inharmonious with their theories as the gauze differs in its contexture. The cross threads of gauze impede the drain, and if manufacturers could supply us with a gauze similar to lamp-wicking we would have advanced one step towards possessing an ideal drainage. Theoretically we should employ the finest gauze in the market, since the activity of capillary movements varies inversely with the diameter of the capillary tube. For my purpose I use the dry sublimated (1 to 2000) gauze or a 10 per cent. iodoform gauze. This is to be cut into narrow strips one-half to one inch in width, varying with the conditions to be treated. The most important requirement is the absolute sterilization, which should be done with dry heat immediately preceding the operation. Under no assurances would I rely on the gauze which has been sterilized by manufacturers. Do your own sterilizing, and then you know what you have.

From the considerations presented I wish to deduct the following conclusions:

1. The uterus should not be tamponed in aseptic cases unaccompanied by functional disturbances.
2. Firm uterine gauze tamponade does not promote drainage, but, on the contrary, favors retention.
3. In trachelorrhaphy and amputation of the cervix uterine gauze insertion is a hindrance to coaptation, and on extraction a disturbance to primary union.
4. In septic cases, both puerperal and nonpuerperal, very loose gauze insertion into the uterus, which is to be removed within six to eight hours, is highly commendable.
5. In functional disturbances of the uterus—depending upon flexion, mural neoplasms and impeded circulation—thorough tamponade is invaluable.

Dayton Building.

THE SURGICAL TREATMENT OF UTERINE FIBRO-MYOMATA.*

By E. C. Dudley, M. D.

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Chicago.

The object of this paper is not to enlarge upon a great variety of procedures which have become or seem destined to become obsolete, but rather to present briefly the more useful operations for the treatment of fibro-myomata of the uterus. The subject will be divided as follows:

1. Palliative operations.
2. Radical vaginal operations.
3. Radical adominal operations.

1. PALLIATIVE OPERATIONS.

The palliative operations are:

a. Curettage.
b. Electrolysis.
c. Ligature of the uterine arteries and broad ligaments.
d. Removal of the uterine appendages.

a. *Curettage.* The irritating presence of the tumor often gives rise to hemorrhagic endometritis. Curettage is therefore indicated precisely as it would be in hemorrhagic endometritis from any other cause. The operation is generally followed by a degree of relief from menorrhagia, is seldom permanent in its results and must usually, there-

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fore, be repeated again and again. It is especially useful in connection with intrauterine gauze tamponade to control hemorrhage until an exhausted patient can gain blood and strength for a more radical operation, or in cases of small tumors until the menopause has passed. Curettage of the myomatous uterus gives increased danger of sepsis; hence the necessity for great antiseptic and aseptic care.

b. *Electrolysis*, especially electro-puncture, must be taken as a surgical procedure; even the simple intrauterine electrode is powerfully caustic, and therefore surgical. Undoubtedly this agent may, in a limited number of selected cases, be capable of producing a more or less permanent symptomatic cure. The earlier promise of its enthusiastic supporters, however, has not been fulfilled. Its immediate dangers also are considerable. The survival of this method depends chiefly upon the patient's ignorance of its inadequacy and dangers, upon her worship of the mysterious, upon an unreasoning dread of operative measures and upon a desire to grasp any other promising means of relief.

c. *Ligature of the uterine arteries and broad ligaments.* The purpose of these measures is to shut off the blood supply to the uterus and by this means to induce atrophy of the growth. Gottschalk, of Berlin, reports cases of multiple myoma in which he ligatured the uterine arteries with good results. Martin ligatures the whole base of the broad ligament so as to include not only the uterine artery but its branches and certain uterine nerves. He even goes so far in desperate cases as to ligature also the ovarian artery on one side. Robinson reports successful cases in which he has ligatured the Fallopian tubes and broad ligaments, including the ovarian and uterine arteries on both sides. The method has hitherto failed to elicit much discussion. Even its authors of late preserve on this subject an ominous silence.

d. *Removal of the uterine appendages.* This procedure, which suggests the names of Batty, Hegar and Tait, when properly carried out—*i. e.*, when the ligatures are placed close to the uterus so as to include a large part of the broad ligament —usually stops the hemorrhage and reduces the tumor, sometimes even causes it to disappear. Its dangers, however, are nearly if not quite as great as those of the more radical operations. This is equally true since the technique of the latter has been perfected. Removal of the uterine appendages for fibro-myomata is becoming an obsolete operation.

2. RADICAL VAGINAL OPERATIONS.

The vaginal operation is preferable when the tumor can be readily reached by that route. All cervical fibroids, all intrauterine pedunculated fibroids and some of the more accessible submucous fibroids have usually been removed by the vagina. In their removal the *ecraseur* and galvano cautery so often used for hæmostasis are unnecessary, because hemorrhage is either not feared or can be readily controlled by the uterine gauze tampon. This route has usually been reserved for the smaller tumors of a size not larger than the capacity of the small pelvis. Latterly, however, the vaginal method has been often and successfully used by certain French surgeons for the removal of much larger tumors. Their removal is accomplished by repeatedly seizing the presenting part of the tumor with vulsellum forceps and cutting away as large a piece as possible with the scissors, one piece after another, until the whole tumor has been removed. I refer to the operation by traction and morcellement. This method, although generally supposed to be of more recent origin, was really described by Dr. T. A. Emmet more than thirty years ago, and has been constantly advocated and practised by him ever since. It is applicable to those cases in which the tumor is accessible through the vagina but too large to be enucleated and delivered entire.

The operation of traction and morcellation will undoubtedly become more and more a procedure of election in place of hysterectomy when its technique is more generally understood and its advantages more appreciated. Many large submucous or mural tumors for which the abdomen is now opened and the uterus sacrificed may be rapidly, safely and effectually managed by this method. One strong contraindication to the vaginal route for large tumors must always be, however, the constant possibility of pus tubes or ovarian abscesses, so often unrecognized or unrecognizable when they occur in connection with large, irregular fibro-myomata. Many a fatal result has followed the rupture of an unsuspected pus tube caused by most careful enucleation or morcellation through the vagina. The vaginal route, then, should be avoided if there be any reason to suspect purulent disease of the uterine appendages. The tumor is usually made more accessible and its enucleation or morcellation is facilitated either by dilatation or more frequently by deep lateral incisions of the cervix, even to the internal os. These incisions having been made, the anterior and posterior lips of the cervix are drawn well down to the vulva and held widely apart by means of strong double-tooth forceps in the hands of an assistant. The operator then seizes the presenting part of the tumor with strong tooth forceps and removes it, either by enucleation or by morcellation. If the tumor be of mural origin it may be necessary to divide the mucous membrane and submucous muscular tissue before commencing the enucleation. This incision should be parallel to the uterine canal.

I now propose a possible improvement upon the two lateral incisions. It is a simple median incision through the anterior wall of the uterus as follows:

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1. Make a circular incision in front of the uterus, which shall separate the vaginal wall from the cervix at the utero-vaginal attachment.

2. Incise the anterior vaginal wall from the point at the middle of the first incision for a distance of one-half to three-fourths of an inch, taking care not to invade the bladder and to avoid the ureters on either side.

3. Separate the bladder from the uterus by means of the finger or some other blunt instrument, keeping close to the uterus, until the peritoneum is reached but not divided. Then expose with retractors the anterior wall of the uterus.

4. Divide the anterior wall of the uterus longitudinally in the median line by means of scissors to whatever extent may be necessary to render the tumor accessible. If necessary the peritoneum may be opened and the incision carried high up into the corpus uteri.

This simple anterior incision would permit wide separation of the lateral fragments of the anterior uterine wall and thereby expose the endometrium, and in selected cases would render accessible a myoma in any part of the uterine wall. It would probably have the following advantages over the lateral incisions:

1. Less traumatism, one incision instead of two.

2. The parametria are not opened and exposed to possible sepsis.

3. The tumor would be more accessible, because the anterior uterine wall would be out of the way instead of being between the operator and his field of operation.

4. A much longer incision may be made if necessary, because the broad ligaments are not involved.

5. Less hemorrhage.

6. The pelvic cavity may be easily reached for any accessory operation on the uterine appendages or peritoneum. Even a small pedunculated or subperitoneal tumor could be removed.

3. RADICAL ABDOMINAL OPERATIONS.

The radical abdominal operation includes the following subjects:

1. The extraperitoneal versus the intraperitoneal treatment of the stump, *i. e.*, the clamp versus the ligature.

2. The removal of the tumor together with the whole or a part of the uterus and its appendages.

3. The removal of the tumor, leaving the uterus and its appendages intact, so as to preserve their reproductive functions.

The question of intraperitoneal versus extraperitoneal hæmostasis recalls the old contest between the clamp and the intraperitoneal ligature in the treatment of the pedicle in ovariotomy; a contest which resulted in a complete victory for the ligature and necessarily established the general principle that the extraperitoneal method is relatively dangerous and consequently, whenever perfect hæmostasis by the intraperitoneal method is practicable, should be avoided. Undoubtedly this general principle should apply with some force to the removal of other abdominal tumors. Nevertheless the earlier statistics in myomectomy and hysterectomy show that the dangers which necessarily belonged to the clamp were more than balanced by the insufficiency of any means then known of intraperitoneal hæmostasis. The advocates of the clamp based their objections to the ligature upon the supposition that the moist, soft uterine stump, when ligatured and returned to the abdomen, would at once become a source of danger from hemorrhage and decomposition, with consequent peritonitis and sepsis. However tightly the ligature was drawn around the uterine stump, however carefully the flaps of the stump were stitched together, however perfect the hæmostasis may have appeared upon the completion of the operation, the fact remained that shrinkage of the stump within a few hours, with consequent loosening of the ligatures, almost invariably occurred from the escape of serum, and fatal hemorrhage or sepsis often followed. The extraperitoneal method therefore became for a time almost universal, and with improved technique gave promise of becoming the established method. In the hands of Keith and a few other extraordinary surgeons it gave a singular freedom from mortality; but the mortality was unfortunately too great in the hands of the average operator. This was so because of the extreme difficulty in keeping the stump aseptic. It would suppurate in many cases and become the medium of deep peritoneal infection.

In myomectomy the history of ovariotomy has repeated itself—first, the intraperitoneal treatment of the stump; second, the extraperitoneal treatment, rendered necessary on account of the difficulty of intraperitoneal hæmostasis. Now, finally, the intraperitoneal treatment has become the established method in myomectomy.

The great condition hitherto wanting is now supplied by ligature of the uterine and ovarian vessels, thereby shutting off the blood supply from the field of operation. This not only renders the operation bloodless, but prevents secondary hemorrhage. It now seems extraordinary that the very first men who ever attempted myomectomy did not realize the surgical necessity of first shutting off the blood current by ligaturing these vessels. Instead of using the simple, direct, natural procedure, we have been for a quarter of a century groping about in the dark, searching in out of the way places for a method by which we could secure intraperitoneal hæmostasis. Just as soon as Baer and others began to ligature these vessels the whole procedure became simple. It is the old story of Columbus and the egg over again.

It would be unprofitable here to continue the

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discussion of the clamp against the ligature in the surgical treatment of uterine fibroids. The subject is rapidly passing out of the field of discussion and becoming a matter of history. There is, however, a limited class of cases in which the very much constricted stump may readily be brought into the abdominal wound and fixed there by means of the clamp in a much shorter time than would be required to secure hæmostasis by ligature of the uterine and ovarian vessels, and to complete the operation by the intraperitoneal method. In such a case, if the condition of the patient is precarious, the clamp will always be useful, because it will enable the surgeon to complete the removal of the tumor with the minimum of operating. It will then fulfill a most important indication—the saving of time.

Nearly eight years ago I reported to the Chicago Gynæcological Society a case* operated upon in St. Luke's Hospital, in which the abdomen was opened, the tumor enucleated and the cavity from which the tumor had been taken stitched into the abdominal wound by means of catgut sutures. By this means the uterine wound made by enucleating the tumor was rendered extraperitoneal. The tumor cavity was then tightly packed with a continuous strip of gauze to control hemorrhage and to drain through the abdominal wound.

This operation differs from the so-called "peritoneal cuff operation" recently introduced by Dr. Senn somewhat in detail but not at all in principle. I have recently learned, however, that Dr. Polk, of New York, described substantially the same operation before the New York Obstetrical Society, in January, 1888, thus anticipating me by a few months, but he soon abandoned it for hysterectomy. When I first described this operation I regarded it, for selected cases, as a great advance in the surgical treatment of uterine myomata, because it saved the reproductive organs. In about fifty cases it gave me a mortality of only two or three per cent. Now, however, I would usually prefer one of the modern intraperitoneal operations soon to be outlined.

The grounds upon which the extraperitoneal method, whether by clamp, elastic ligature or suture, should for the most part be discarded, may be given as follows:

1. No greater safety in the extraperitoneal method.

2. Fixation of the whole or a part of the uterus to the anterior abdominal wall is objectionable from the anatomical standpoint, and often gives the patient great inconvenience from traction and from other mechanical causes.

3. Extraperitoneal hæmostasis in any form is apt to cause unnecessary adhesions. It usually makes a longer and more tedious convalescence.

4. Greater danger from ventral hernia.

*Reported before the Chicago Gynæcological Society, May, 1889, and published in the *American Journal of Obstetrics*, September, 1889.

OPERATIONS WITH INTRAPERITONEAL HÆMOSTASIS.

To illustrate the various operations which may be performed with intraperitoneal hæmostasis, I will briefly present from my notebooks the histories of three operations performed on three consecutive days, November 4, 5 and 6, 1895.

Case 1 was of many years' standing. Electrolysis—electro-puncture—had been repeatedly used. This treatment had been followed by extensive, almost fatal pelvic peritonitis. There had been so much inflammation of the tumor itself that it could not be easily shelled out of its capsule. On account of extensive adhesions to the abdominal viscera, and the inaccessibility of the field of operation and the bad condition of the patient, the operation presented unusual difficulties. After ligaturing the uterine and ovarian vessels, the tumor, weighing about ten pounds, and the entire uterus with its diseased appendages, was removed. The operation necessitated great traumatism in the pelvis, and large surfaces were left uncovered by peritoneum. The pelvic cavity was therefore packed with gauze. This gauze was continued into the vagina and left as a capillary drain. The abdominal wound was closed without abdominal drainage.

Case 2. The next case was very much like the preceding one, but the tumor was somewhat smaller, and there were no adhesions. Both tubes were distended with fluid, and each ovary was as large as the double fist. The tumor, the entire uterus and its appendages were removed, as in Case 1. The broad ligament stumps were drawn down into the vagina and held there by sutures. The vaginal and abdominal wounds were completely closed, the latter with catgut sutures. No drainage.

Case 3. On the following day the third case presented itself with a perfectly round, globular tumor as large as the double fist, springing from the anterior wall of the uterus. This tumor was removed by an incision through the corpus uteri, precisely such as would be made in a Cæsarean section. Temporary hæmostasis was secured by a rubber ligature. This was removed before closing the abdominal wound. The tumor having been enucleated, the cervix dilated and the granulations curetted out of the endometrium, the cavity of the uterus, which communicated with the uterine wound, and the vagina were packed with a gauze drain. The uterine wound from which the tumor had been enucleated was then closed as in Cæsarean section, the entire uterus was dropped back into the pelvic cavity, and the abdominal wound closed without drainage. The Fallopian tubes and ovaries were preserved intact.

The method adopted in this last case is undoubtedly applicable to the treatment of a much larger number of tumors than is generally supposed. I

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desire to emphasize the statement that any surgeon who is constantly alert to enucleate the tumor and preserve the reproductive organs will be surprised at the number of cases in which this is entirely feasible. The mutilating operation of hysterectomy for fibro-myoma is often necessary, but not so often as the statistics of the present time would indicate. In the vast majority of cases the uterine appendages will be found normal, and in a large proportion of this majority the tumor may be enucleated from the uterus and the wound successfully closed, precisely as would be required for the removal of such a tumor in any other part of the body. Cases of very large tumors and cases in which many small tumors are scattered through the uterine wall may require hysterectomy. The conservative operation of simple enucleation will apply in many cases when the tumor is even larger than the fœtal head, and in cases of multiple myomata when there are not too many tumors.

If the tumor is subperitoneal, and especially if pedunculated, the uterine traumatism is superficial and easily treated with catgut sutures. In mural tumors large numbers of deep buried catgut sutures may be used in bringing the surfaces of the uterine wound together, and then some modification of the Lambert suture may be used in closing the peritoneal margins. If the tumor is submucous and the uterine cavity is invaded in its removal, the same method of buried sutures applies. In these cases it is well to tampon the uterine canal and vagina for drainage with a continuous strip of sterilized gauze. The question has been raised whether the wound made by enucleation of a mural tumor without entering the endometrium should be simply closed with buried catgut sutures and left without drainage into the uterine canal, or whether an opening should be made into the endometrium for that purpose. I have operated several times in both ways and always with success. I recall one case, however, of large tumor, the enucleation of which made a very extensive wound in the uterine wall. This was closed with buried catgut sutures without establishing any drainage into the uterine cavity. The patient recovered, but only after a period of high temperature and rapid pulse, which lasted for about two weeks. During this time the uterus was enormously swollen, and I feared suppuration in the uterine wound. Nothing, however, was done in the way of a secondary operation for drainage. The experience of this case indicates that drainage into the uterine cavity is desirable for large uterine wounds. In the introduction of the gauze tampon I always dilate the uterine canal from the abdominal side, the temporary elastic ligature being in place around the cervix, and then force a continuous strip of gauze three or four inches wide down into the vagina, packing the vagina first and then the uterine cavity. All of the gauze may be removed in forty-eight hours by traction from the vagina. If not removed within two or three days it is apt to produce high temperature and rapid pulse, which usually subside promptly upon its removal.

I have presented these three cases, all of which recovered, for the purpose of illustrating the fact that there can be no stereotyped operation for uterine myoma. Each case must furnish its own indications for the particular operation which applies to it. Sometimes the entire uterus and its appendages must be sacrificed; often they may all be preserved and their functions restored; sometimes the cervix uteri alone may be left, after the method of Baer. Often, as in case I, the injury to the pelvic peritoneum is so great that gauze packing is necessary for drainage and hæmostasis. In other cases the injury is so slight that when the ligatured stumps are drawn down into the vagina and the vaginal and abdominal wounds are closed, there is no peritoneal traumatism save the united wounds, and therefore no need of gauze packing. The modern tendency is properly on the side of the vaginal drain as against drainage through the abdominal wound. When no opening has been made into the vagina in the course of the operation proper, and drainage is necessary, I would favor as a general proposition that such an opening be made there, posterior to the cervix, or through the cervix, for the purpose of drainage. The advantages of this are, first, better drainage; second, complete closure of the abdominal wound; third, consequent rapid convalescence; fourth, minimum risk of ventral hernia.

In myomectomy the uterus should if possible be saved when the tubes and ovaries are healthy. When the appendages have to be removed the uterus may as well go with them, especially if its removal facilitates drainage or in any way renders the operation more simple. I do not however share a certain modern prejudice against the uterus, which would prompt one to remove it simply for the purpose of getting it out of the way.

1617 Indiania Avenue.

DISCUSSION.

The papers in this section were discussed as follows:

Dr. ABBOTT: I would like to ask Dr. DUDLEY if there is not danger of wounding the bladder both in making the incision and in making the traction afterwards?

Dr. DUDLEY: I answer the question of Dr. ABBOTT as follows: Wounding of the bladder with ordinary care would be hardly possible. Of course it is necessary to keep close to the uterus. I once opened a cancerous bladder in making this incision, but the accident was due to faulty technique and need not have occurred. The resultant fistula healed promptly and gave no trouble. I would like to ask Dr. MCLAREN if he has practically abandoned the abdominal route and adopt-

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ed the vaginal route in pyosalpinx. For my own part, I am not convinced that the vaginal route will become universal or even be adopted in the majority of cases. Will Dr. McLaren tell us how to differentiate the indications for the vaginal from those of the abdominal route.

Dr. McLaren: This paper which I have just read gives me less satisfaction than any paper that I have ever written. It does not take up the subject in the broad sense which it should have done, but confines itself too closely to the large pelvic accumulations of pus. Women with these large pelvic abscesses are usually profoundly septic and in the worst possible condition for a grave surgical operation. Knowing the results that almost all operators were getting in attempting to remove these suppurating tubo-ovarian sacs, I was led to try vaginal section, with the result already stated.

One of the most important after-results following vaginal section and drainage, is, besides the immediate recovery, that many of them regained their tubo-ovarian functions.

Dr. McDowell, of Staples, has reported to me this evening that a case of his upon whom we operated six months ago, then an invalid on the edge of the grave, is apparently perfectly well and doing her own work. In answer to Dr. Dudley's question, I would say that I do not believe that any *one* surgical procedure can relieve all cases of pelvic suppuration. There are a great many small, deep abscesses, in which abdominal section will always be necessary, and, on the other hand, there are a great many of the worst cases of large abscesses and profound sepsis where I would lay particular stress upon vaginal section as being all that is necessary for immediate as well as permanent results.

In answer to Dr. Dudley, I would say that in large, inflammatory exudations I would usually explore the pelvis through an opening made in the vagina behind the cervix, with the blunt dissection—would push the finger up into the inflammatory mass, opening the various compartments of the abscess, if more than one should exist, by touch. If, on the other hand, the inflammatory mass is small and deep in the pelvis, I would then operate by the abdominal route.

Dr. Dudley: I do not think I have heard the answer to my question yet. Is not Dr. McLaren in precisely the same condition as other surgeons who are all at sea, or has he made a definite conclusion in his own mind which will enable him to classify those cases in which it is better to work through the vagina for those in which it is better to work through the abdomen. The vaginal route has two principal advantages: first, better drainage; second, less disturbance of the abdominal and pelvic viscera and consequently less danger of sepsis. This route will in my judgment be generally preferred when the object is simply to evacuate the pus and not to remove the pus sacs. When suppurating tubes and ovaries have to be removed the difficulties of the vaginal route may become almost prohibitory. It is now an accepted practice in the removal of the uterine appendages to put one ligature on at the junction of the tube with the uterus and another upon the infundibulo-pelvic ligament. This shuts off the circulation from both directions and may enable the operator to make an almost bloodless extirpation. These ligatures, especially the latter, can be applied through the vaginal incision only with great difficulty and sometimes not all. If the ligatures are not securely tied there is great danger of hemorrhage. I have had one such case of fatal hemorrhage in my own practice. It is wonderful how much experience an operator can get from a single case of fatal hemorrhage. August Martin notes the great difficulty of tying these ligatures through the vagina.

Dr. Hunter: When specialists seem to be somewhat at fault I do not know that we general practitioners need worry very much. In making the incision we can feel the sac pressing down into the cut and then feel the fluctuation with our finger where the pus has not declared itself positively, and then we can pass our finger up and drain the cavity. All of the cases that I have drained in this way have terminated successfully. It drains all the tissues that need draining. However, when we can feel in the uterus a sausage-shaped swelling that is movable, I think we would prefer the abdominal operation, because the pus is in the tube, and when we make our section we can get the pus and all the diseased tissues out clean and have the woman well and about in a couple of weeks, which cannot be done by the vaginal route. A little experience a few weeks ago illustrated to me the manner of drainage. If I understood Dr. McLaren, he spoke of using the tube and not the gauze, but in this wide vaginal route it does not seem feasible. It was one of those cases Dr. Abbott speaks of. She had been a woman in perfect health, a hard working woman, but one day she was suddenly taken with cramps in the lower abdomen. There was no temperature, nor any chill. At the time I saw her, ten days after the attack, she had been in bed three days, and in the pelvis I found a very large fluctuating mass. It seemed to me probable that this was a case of hemorrhage and therefore I opened into the vagina. It was not ectopic gestation, as there were no signs of pregnancy. I opened the abscess and in that was a free mass of pus and water which I cleaned out. In making a manipulation over the top of the swelling there gushed out a lot of very offensive pus—it had a very offensive odor. Fortunately I was able, with my two fingers, to push the bowels back so that the pus from the abscess did not get into the free abdominal cavity, but there was over a quart of pus let off. I wished I

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had adopted the vaginal route. I passed the forceps down through the vaginal cut behind the uterus, and made a large free opening so I could draw a gauze drain, probably the size of the wrist, through the vagina and let it out of the abdominal opening. Now comes the interesting feature to which I want to call special attention, as since then the same thing has happened to me. This patient did beautifully for twenty-four hours; everything looked fine, but on my next visit she was very low; she was maniacal; she was stupid, but when roused up would talk incoherently; she refused food and had some rather bizarre notions about food, etc. She had no temperature and no chill. I changed the gauze dressing the second day and got a very large quantity of yellow serum following the removal. About the fourth day the patient came out of her mania and delirium, and much to my gratification made a good and rapid recovery, because she was riding the bicycle again at the end of the fourth week. She was an inveterate bicyclist.

Dr. STEWART: I want to say that I believe there is a difference in the nature of these pelvic abscesses, as to whether they are acute or chronic in their nature, as to whether this pus formation was of long duration or recent formation. I believe, in an abscess of the pelvis of recent formation, the proper thing to do is to open into the posterior cul de sac and establish drainage. After the abscess has become a chronic one, then, of course, different operations are necessary.

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PRACTICE OF MEDICINE.

J. W. BELL, M. D., Chairman.

THE MANAGEMENT OF THE SENILE HEART.

BY J. W. BELL, M. D.

Minneapolis.

Under the questionable title of "senile heart," I desire to call attention to a most interesting form of cardiac disease occurring in persons beyond middle life, especially in the decades between forty and sixty. The term "senile heart" is a most unfortunate one, inasmuch as it is used in an indefinite way by many physicians to include all cardiac changes of a chronic character in old or even middle aged people who look senile. In this paper the term "senile heart" will be used in its restricted sense, hence not including on the one hand previously existing valvular disease, or on the other, those pronounced secondary cardiac changes due to general arterial fibrosis, atheroma or renal disease.

In order to make more clear the morbid condition to which the term "senile heart" is herein applied, permit me to call your attention briefly to the more constant or normal changes occurring in the heart—the result of advancing age. Every healthy individual starts on life's journey with a balance to the credit of his heart, the extent varying in different individuals. This balance we designate as reserve compensatory force. Hence we are not surprised on examination to find the heart showing evidence of slight hypertrophy beyond middle life. This enlargement would seem but the logical outcome of the increased labor forced upon the heart by changes in the arteries, capillaries and extravascular tissues, the result of age. Bizot and Balfour believe this change to be universal in all old people. From clinical investigation, I am convinced of the truthfulness of this statement in the vast majority of cases. This slight enlargement is of gradual growth, unaccompanied by symptoms, and hence should be looked upon as a conservative or beneficial change. As long as the heart muscle maintains its integrity, all goes well with the individual,but if from any cause the innervation or nutrition of the myocardium be seriously interfered with, thus unfavorably modifying the normal senile enlargement, evidence of myocardial weakness accompanied by dilatation of one or more of the cardiac cavities soon appears, leading to grave embarrassment of the heart and circulation. The essential lesion is then a weakened myocardium, accompanied sooner or later by dilatation, the result not of inflammatory or degenerative changes, but of disturbed innervation or defective nutrition, arising from the many causes operative during and after middle life. These causes are so numerous and varied in character as to preclude more than a brief reference to them.

Among the more frequent causes of disturbed innervation may be cited the abuse of alcohol, tobacco, tea, coffee and sexual excesses, business or domestic worry, in fact any cause, physical or emotional, if sufficiently violent or prolonged, may interfere with the innervation of the heart, as evidenced by an irregular and intermittent pulse. Among those causes tending to interfere more directly with the nutrition of the myocardium, may be mentioned anæmia, hydræmia, gout, dyspepsia, etc. As clinicians we are all familiar with the following group of symptoms, constituting a clinical picture met with frequently in the examination of people beyond middle life. An active business man beyond middle life, of good habits, previously free from any evidence of cardiac disease, begins to suffer from breathlessness on the slightest extra exertion, and from præcordial discomfort and distress at intervals. His pulse becomes slightly irregular in rate, rythm or force, perchance intermittent. Slight overwork or worry precipitates an attack of palpitation; he becomes painfully conscious of the presence of a heart; consults his medical attendant, who finds on examination the following signs: A weak, almost imperceptible cardiac impulse located in or near the left nipple line. On careful percussion, the deep cardiac dulness is found to be slightly increased. On auscultation, the heart sounds early may be normal; later, the first sound becomes shorter and weaker, accompanied by a slight systolic murmur, audible at the apex and frequently over the pulmonary area, if the left auricle be enlarged. I have seldom observed that sharp accentuation of the aortic second sound described by Balfour, which he ascribed to dilatation of the ascending portion of the aorta, but have frequently observed a short, faint, systolic murmur over the aortic area, faintly transmitted along the vessel, due, I believe, in the majority of cases, to dilatation of the ascending portion of the vessel. The above clinical picture is but the reflex of a weakened myocardium, accompanied by dilatation of one or more of the cardiac cavities, which condition, if not recognized and relieved by proper treatment, soon gives rise to grave changes in the heart. These changes become apparent in the enlarged percussion area, and by the presence of murmurs over the several valvular areas, accompanied or soon followed by all the unpleasant symptoms of cardiac failure, soon ending in death.

For the purpose of treatment we may divide the clinical course of the disease into two periods or stages. First, the period of progressive and often slow development of myocardial weakness, ac-

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companied by breathlessness, præcordial distress, irregular pulse and occasional attacks of palpitation. Second, the period of advanced myocardial weakness, accompanied by marked symptoms of cardiac insufficiency, such as constant præcordial distress, dyspnœa, frequent attacks of palpitation, marked irregularity of pulse, tachycardia, bradycardia, angina, and, later, all the symptoms of general venous engorgement, ending fatally if uncontrolled.

The first period requires principally hygienic, dietetic and general tonic treatment, our efforts being directed toward making the cardiac muscle equal to its task and to maintaining its integrity. Each individual case should be carefully studied, an accurate diagnosis being the first essential to successful treatment. Having, then, a clear conception of the patient's condition, it should be carefully and frankly explained to him, unless there be special reasons to the contrary, when it should be explained to a friend or relative. The patient must be made to understand why he is to follow instructions explicitly, and informed that if he transgresses his sin will manifest itself in more frequent and severe attacks of præcordial distress, dyspnœa, palpitation and, perchance, angina. Having secured the confidence of the patient, our first endeavor should be to discover and remove every possible cause of cardiac irritation and embarrassment. Our second effort should be to so regulate the diet, exercise and habits of the individual as to bring the general nutrition, as well as that of the heart muscle, up to the highest possible point and maintain it. For this purpose, in addition to hygienic and dietetic measures, general tonic treatment, consisting, according to indications, of iron, strychnia, arsenic and bone marrow, will be found necessary. The patient should be advised to eat and sleep regularly, using three meals daily, composed of nutritious food suited to the requirements of his special case, the mid-day meal always being the principal one, no solid food being allowed between meals, little or no fluid with meals. The lungs should be supplied with a liberal diet of oxygen; hence the sitting and sleeping apartments of these patients should be well ventilated, tent life being the ideal one; they should be urged to sleep at least ten hours out of every twenty-four, with a mid-day rest in the recumbent position of at least one hour following the principal meal, in order to minimize the daily labor of the heart; the latter injunction should be rigidily followed the remainder of the patient's life. The question of exercise must be carefully considered in relation to each individual case, and with special reference to the condition of the myocardium. However, in the large majority of advanced cases of "senile heart" absolute rest in the recumbent position will be found necessary for a time at least. The patient's habits should be carefully regulated, tobacco, alcohol, tea and coffee should be interdicted. He should be urged to lead a quiet, orderly life, as free from worry and excitement as is compatible with our modern civilization. Our resources will be sorely taxed in our endeavors to regulate the habits of senile patients. Yet it is attention to the little things of eating, drinking and doing which makes success possible in dealing with this condition. How futile to attempt to restore the dilated heart of the tobacco-fiend, opium-eater or alcoholic unless he forswears the habit.

Unfortunately, these patients do not present themselves for treatment until marked weakening of the myocardium has occurred, indicating the second or advanced stage of the disease. We are then confronted with the difficult problem of medicating a weak and dilated heart in an individual having, by virtue of his age, suffered certain vascular as well as extravascular changes, causing increased intraärterial and cardiac blood pressure. Hence, the condition of the circulation, as indicated by intraärterial and cardiac pressure, becomes the key to successful treatment.

For the relief of the more of less high intraärterial pressure, we rely largely on the iodides and nitrites. I have found the iodide of sodium, in from two to five grain doses, repeated three times daily, of marked benefit in dilating the arterioles, thus reducing intraärterial pressure; the iodides having a much more prolonged action than the nitrites, are to be preferred for internal administration. The digitalis group, consisting of digitalin, strophanthus, strychnia, caffein, spartein, etc., render most excellent service in giving tone to the weakened myocardium, when combined with vascular stimulants like the iodides and nitrites.

In the management of pronounced cardiac insufficiency, no method of treatment has proved so eminently satisfactory in my hands as that of subcutaneous medication, assisted by baths, saline cathartics, Swedish movements and massage. During the past three years it has been my pleasure to see many cases of advanced cardiac dilatation respond to strychnia, digitalis, nitroglycerin and atropia hypodermatically administered, which would speedily have succumbed under any other treatment at my command.

In order to secure the best possible results, strychnia, digitalin and nitroglycerin should be combined for a time, later omitting the digitalin, or using it interruptedly, according to indications, in every case increasing the dose of strychnia until it produces muscular twitching, and there maintaining it. The smallest dose of nitroglycerin capable of producing the desired dilatation of arterioles should be the rule. It has been my custom to begin with the 1-40 of strychnia, used every six or eight hours, gradually increasing the dose until its characteristic muscular manifestations appear, always combining it with nitroglycerin, and adding digitalin as indicated.

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Subcutaneous medication is especially indicated in the aged, owing to their naturally feeble gastric absorption, but more especially in the management of cardiac dilation, owing to the accompanying gastric catarrh resulting from venous engorgement. It is urged against the subcutaneous method of treatment that it requires the presence and expense of a trained nurse; on the contrary, any intelligent person can be quickly trained to use the hypodermic syringe, thus enabling the physician to carry out the treatment at the patient's house without additional expense.

In suitable cases, saline baths of a proper temperature are an efficient aid in freeing the peripheral circulation, thus relieving venous engorgment and its attendant ills. I employ the following simple method: beginning with a bath of ten minutes duration, the bath to consist of forty gallons of water at a temperature of one hundred degrees, gradually lowered to ninety-two, holding in solution four and one-half pounds of chloride of sodium. This is repeated daily for some days, then less frequently, gradually increasing the amount of saline, as well as the duration of the bath, from day to day, until the patient remains in the bath at least twenty minutes. I have never observed any unpleasant effects; on the contrary, in the majority of cases, patients have expressed themselves as feeling relieved and refreshed. During the bath the pulse becomes slower and fuller, respiration slower and deeper, the cardiac impulse stronger and more circumscribed, with apparent at least temporary decrease in the transverse cardiac dulness. Massage and Swedish movements properly applied are useful aids in improving the circulation, the latter in the form of movements of resistance being of especial advantage, owing to the feeble muscular movements and sedentary habits of senile patients. Saline cathartics cautiously employed are especially useful in relieving the more or less constant gouty condition present after middle life; later they prove invaluable in removing dropsical accumulations.

We thus see that the clinical history of the "senile heart" is not the story of a few weeks, or even months, but often comprises the life history of the individual in respect to heredity, habits, etc. Consequently, in this struggle with mortality, for it should be constantly borne in mind that we are dealing with an incurable condition, we should endeavor by careful investigation to search out and remove every possible cause of irritation and embarrassment, our time and labor being richly rewarded by the knowledge that we can, in the majority of cases, add years of comfort and usefulness to the individual's life.

In conclusion, I desire to emphasize, first, the necessity, yea! the obligation, for early and prompt recognition of the danger signals indicative of beginning senile cardiac insufficiency, believing that no practitioner is justified in ignoring or passing as unworthy of therapeutic attention the breathlessness, præcordial distress and irregularity of pulse so often encountered after middle life. Second, to especially urge upon the profession the more general use of the subcutaneous method of treating cardiac insufficiency.

THE ETIOLOGY AND PATHOLOGY OF PLEURISY.

By H. B. Sweetser, M. D.

Minneapolis.

Bacteriological research has, in recent years, very much modified our ideas concerning the etiology of pleurisy. As late as only 15 years ago, cold and exposure stood at the head of the list as causative agents; today, text-books are liable to speak of them as merely predisposing. Clinical and experimental laboratory work are both accumulating evidence in proof of the contention that all, or nearly all, cases are of bacterial origin. Since 1887 numerous workers in this field have published their statistics, and all of these tend to bear out the above statement. Thus, Hanford, in five cases of apparently benign serous effusion, found 60 per cent. to be tubercular. Netter, in 109 empyæma cases, found germs in all. Jakwoski, in 52 cases, of which 10 were primary, 13 tubercular, the others occurring in the course of the various diseases, found some form of bacterial life in nearly all. Ludwig, of Leipsic, carefully studied 23 cases, of which nine were serous; the empyemas all contained bacteria; of the nine serous cases five were germ free, but of these, four subsequently developed tuberculosis. Fränkel demonstrated microbes in ten out of twelve, and Netter in forty out of forty-six cases. Such reports are becoming more and more numerous, and are leading to the conclusion that the real cause which determines an attack of pleurisy is infection of the pleural membrane by some form of microbic life. The forms most commonly found and which interest us most are the pneumococcus, the tubercle bacillus, the staphylococcus and streptococcus and the typhoid bacillus. The pneumococcus is present in most cases complicating pneumonia and in many of the apparently primary ones. The tubercle bacillus is more difficult to find, and is often undiscoverable in cases which are evidently tubercular, or which are proven to be tubercular by injection of the exudate into the lower animals with the subsequent development of tuberculosis. The staphylococcus and streptococcus exist in cases which tend to become purulent They are the cause of most of the pleurisies arising in the course of the exanthematous, infectious and septic diseases, and this explains the well-known fact

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why such pleurisies are so often purulent. The streptococcus is the more virulent and more certainly produces a pus exudate.

The bacillus of Eberth has been found in apparently primary cases, which, however, subsequently developed into typical typhoid. These cases also are liable to be purulent.

Leaving the bacteriology, we may classify all pleurisies into primary and secondary, the former being the so-called idiopathic cases, arising apparently *de novo* in persons of previous good health, the latter occurring in the course of other diseases.

a. Of the so-called idiopathic cases, a fair number, possibly 30 per cent. or more, are tubercular from the start. These take their origin from some latent focus of infection, such as a tubercular bronchial gland or a tubercular pulmonic lesion too slight to give rise to symptoms. It is worthy of notice that such a tubercular pleurisy starts as frequently at the base as at the apex, is either serous or purulent, may be acute or chronic, and the exudate may be absolutely germ-free. These are the exudates the injection of which produces tuberculosis in the lower animals.

A certain other large number appear to be idiopathic, inasmuch as they rapidly develop from a pneumonia so slight and evanescent as to be undiscovered. The pneumococcus, having invaded the lung tissue, quickly finds its way through the lymph spaces and channels to the pleura, and there excites, by its action the acute pleurisy in the exudate of which it may almost always be found. These constitute the cases which run a short course, respond favorably to treatment, and after absorption or a single removal of the exudate, return to and remain in good health.

Other cases still, classified as primary, but which are really secondary, are those which result from trauma. There can be no question as to their bacterial origin. Lastly, however, there are other cases, and they still constitute a large percentage of all, which we are unable to trace to any definite cause and are unable to explain. They may follow exposure, the exudate is sterile, the course acute and frank, the recovery perfect and there are no immediate or remote sequelæ. These are the cases which appear to prove the influence of cold, atmospheric and telluric conditions and natural idiosyncrasies. Yet, I think, as our methods of observation and investigation become more accurate, these cases will become fewer and fewer.

b. Concerning the secondary cases, they may be subdivided into those which arise from extension of inflammatory processes in contiguous tissues, and those which occur independently, as in the infectious diseases.

Every pneumonia which reaches the surface of the lung is accompanied by more or less pleurisy, the exudate being most commonly plastic, sometimes either serous or purulent, and greater or less in amount. Likewise the vast majority of cases of well-marked pulmonary phthisis and pulmonary tuberculosis are complicated with more or less pleuritic inflammation. This results either by direct extension or from rupture of a tubercular lung cavity, or is a genuine tubercular process. The exudate may be of any variety, and contain no microörganisms at all, or only the tubercle bacillus. Pus germs are most generally absent, though as a mixed infection they may occur. Pleurisy accompanies endo- and pericarditis in 70 per cent. of the cases. It is also liable to occur as an extension by contiguity in malignant disease of the lung, mediastinum, abdominal organs or breast. It may follow caries of the ribs, erysipelas of the cutaneous surface, peritonitis or abscess in the abdomen, perityphlitis, appendicitis, etc.

As a secondary independent lesion, pleurisy most often is found complicating the exanthematous and infectious diseases, Bright's disease, cirrhosis of the liver, inflammatory rheumatism and gout. Of the infectious diseases it occurs most frequently in scarlet fever, less often in measles and whooping cough. It was present in eight per cent. of cases of typhoid fever in Munich. It is also not uncommon after influenza, cerebro-spinal meningitis, infectious dysentery and septic conditions generally.

It may come on during the acute stage in any of the above conditions, but more commonly it occurs during convalescence, and is then liable to be insidious. The exudate is most often purulent. In gout and in inflammatory rheumatism, pleurisy is frequently found; and one author goes to the extreme of considering that most cases are rheumatic in origin, and finds great benefit from the exhibition of the salicylates. It is a well observed fact also that inflammations of the pleura, as of other serous surfaces, occur frequently as a terminal event in the course of nephritis, hepatitis, diabetes, etc. Observation has shown that very many of these are examples of tubercular infection. Pleurisy in syphilis is rare, and may either be an extension from the lung or from a gumma in the ribs, or primary. It occurs most often early, but may be delayed several months or years. It yields only to specific treatment. It is bilateral as frequently as single, and the exudate is most often serous.

Pathological anatomy. For practical purposes from a clinical standpoint, all cases of pleurisy naturally divide themselves into four classes from the character of the exudate.

The first is that in which the exudate is almost entirely lymph, the so-called dry or plastic cases. It is seldom idiopathic, although rarely a primary tubercular case takes this form. Most frequently it arises by extension of inflammation from the lung, and when chronic is likely to be tubercular. The exudate varies in thickness, sometimes being very thin, at other times so thick as to cause compression. If the deeper layers of pleura are not

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involved, and there is not extensive destruction of the endothelial layer, this exudate may be entirely absorbed, and the pleura return to its normal healthy condition. But very much more frequently the lymph is replaced by true connective tissue and thus are produced permanent adhesions which more or less completely bind the pleural surfaces together, being sometimes only fine delicate threads, but at other times so extensive as to entirely obliterate the pleural sac and bind the lung so closely to the chest wall that it has to be cut out in order to be removed.

The second class comprises those cases in which the exudate is predominantly serous. These constitute most of the cases which begin apparently as primary, or accompanying nephritis, cirrhosis of the liver, rheumatism, etc. As we have seen above, a large proportion of these are tubercular, especially those which are germ-free. The amount of fluid contained in the pleural sac in these cases varies from a few ounces up to a number of quarts. If the amount is large, compression effects are exerted on the surrounding structures; the lung on the affected side is forced upward and backward and inward against the spinal column, and is compressed into a leathery, airless mass; the opposite lung becomes hyperæmic and, in acute cases, œdematous; the heart is displaced to the opposite side, and its action interfered with; the intercostal spaces bulge out, and in children the whole lateral chest becomes enlarged; the diaphragm is depressed. If this compression is exerted beyond a certain variable period, subsequent expansion of the lung may not be able to take place, and then absorption or removal of the fluid is followed by retraction and flattening of the chest-wall and distortion of the spine. Excessive amounts of fluid, however, may exert so much compression and dilatation as to lead to permanent deformity, even though removed at the earliest moment.

The third class of cases is that in which the exudate is predominantly purulent, i. e., the empyemas. The cases which we have learned clinically to anticipate will be purulent are: the pleurisies of children, those which occur in the course of the exanthematous and infectious diseases or in septic and pyæmic conditions, those arising insidiously during convalescence from some pneumonias, or in gangrene of the lung, and those consequent upon rupture of an abscess cavity or secondary to peritonitis, appendicitis or caries of the ribs. The pressure effects are the same as those of the last class, but the presence of pus adds a new element to the pathological picture. The pleura is more deeply infiltrated, and points of necrosis may occur on either surface, which may eventuate in rupture, either into the lung or upon the cutaneous surface, or into the peritoneal cavity. Rupture into the lung may allow of entrance of air into the pleural sac, producing the condition known as pyo-pneumo-thorax. In passing, however, it may be said that pyo-pneumo-thorax is a result much more frequently of lesion outside the pleura. Rarely it may arise from decomposition of fœtid pleuritic effusions.

Furthermore, the presence of pent up pus may, in the pleura or elsewhere, lead to amyloid degeneration, especially of the liver and kidneys. Occasionally a pyæmic condition may be induced and metastatic abscesses may occur at distant points; thus I have seen a large encapsulated cerebral abscess as a late and fatal complication.

As pus is practically non-absorbable, if not relieved by operation it will tend to liberate itself. The point at which pus most often finds an exit in empyema is in front of the region of the breast. This is a point worthy of note, as, without care, an erroneous and fatal diagnosis of deep-seated abscess of the breast might be made, as in a woman with well developed mammary glands. Other directions in which an empyema may discharge are into the lung, downward into the peritoneum, or behind the peritoneum into the groin, simulating a psoas abscess.

The pus in empyema most often lies free in the pleural sac, but it is important to remember that in a certain number of cases adhesions may form between the visceral and parietal pleuræ, thus confining the pus in different saccules. In such cases, unless extraordinary care is exercised in diagnosis, one sac only may be emptied by operation, the retention of pus in the other leading to a fatal issue. In other cases a purulent effusion which has become thick by absorption of the fluid portion, or the deposition of lime salts in the fibrous tissue may lead to difficulties in diagnosis.

The fourth class comprises those cases in which the exudate contains blood visible to the eye, viz., the hemorrhagic cases. This is so invariably the type of exudate in pleurisies due to malignant disease, carcinoma, sarcoma and sometimes tuberculosis, that we may take it as a fairly certain sign upon which to base a diagnosis and prognosis. Nor should we be misled by the apparent acuteness of the pleurisy. I have lately seen such a case in which the symptoms presumably dated back only three weeks before death in a young man, well nourished, whose only previous complaint had been an enlarged testicle, and yet the autopsy revealed a lung enormously enlarged from carcinomatous infiltration, involving the pleura and dislocating the heart.

One error must be guarded against, however, and that is mistaking the blood coming from a puncture of the lung by the exploring needle for blood drawn from the pleural sac. Also that the prognosis may not be absolutely hopeless in individual cases, it may be stated that some cases are on record in which bloody fluid has been drawn from the pleural cavity and which yet subsequently recovered and remained well.

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A WORD ON THE SYMPTOMS AND TREATMENT OF PLEURISY.

By E. J. Abbott, M. D.

St. Paul.

In the short time necessarily allowed it is impossible to go fully into the details of the diagnosis and treatment of pleurisy, but even if it were, it is useless to thrash over old straw, and I do not wish to waste time by going over again all the various points which are so well known to every medical man.

The question of the position of the patient, which we have all found from experience is not as pathognomic of pleurisy as we were taught in our college days, the varying percussion notes, the friction murmur, the fremitus, the sigmoid curve of effusion, and the Skodiac resonance at the apex, are all too familiar to need repetition. The only point in auscultation to which I wish to call attention is the frequency with which a crepitant râle is pleural, rather than pulmonary, and is a form of friction râle. The classical description of pneumonia never omits the crepitant râle and the râle redux, and we all know the reliance that is placed on them as diagnostic of the congestive and resolving stages of pneumonia and the explanation of them as due to the separation of the walls of the air vesicles.

But how often do we have a pneumonia without any accompanying pleurisy, and why is not the approximating of the pleural surface covered with exudation a better explanation than the old one? When the lung is thoroughly hepatized and no longer expands with inspiration the râle stops, to begin again when resolution has advanced far enough to allow again of movement of the lung.

Careful attention to patients suffering with pleurisy will frequently reveal a crepitant râle when the other signs are such that pneumonia can be positively excluded. Andral, in speaking of prolongation of the various stages of pneumonia, mentions one case in which the crepitant râle existed for eight days, when a fatal termination and autopsy revealed the fact that there was no hepatization, yet it does not seem to have occurred to him that the crepitant râle might have been pleural.

Wilson, speaking of the friction sound, says: "It is usually grazing in character at first, but becomes coarser in quality as plastic exudation proceeds, and from being audible only in inspiration, becomes audible also in expiration. It is difficult at times to distinguish this from a fine râle, but it is usually recognizable by its fine character, by its uniform evolution and in its coarser form by its persistency."

Recent writers frequently report the close resemblance that is often found between the crepitant râle of pneumonia and the sound of a pleurisy when the exudation has covered the dry surface of the pleura, and so has destroyed the sharp, dry rub that is by so many considered the only form of friction rub, but they seem loth to admit that the crepitant râle of pneumonia could be due to anything else than the separation of the moist walls of the vesicles. With the well known fact that croupous pneumonia is almost invariably pleuro-pneumonia, why is not the pleural explanation of this râle better than the pulmonary? I have frequently examined patients with old chronic pleurisy in which the crepitant râle is never absent. It is accentuated and intensified by a so-called cold, but it is always present to some extent, and yet there is no pneumonia present.

Fortunately these patients do not often die, and post mortems are by no means frequent, but I have seen enough of them to know that a typical râle can exist when no pneumonia is present, while the cases in which a pneumonia was present had also an exudation pleurisy. It may not make much difference practically which this is due to, but when a writer in a standard medical work advocating thorough blistering in the treatment of pneumonia says "by this method it is frequently possible to cut short a pneumonia so that it will not advance beyond the crepitant râle," we are forced to the conclusion that his crepitant râle was probably pleural.

Another feature that is sometimes found on auscultation in a left pleurisy is the cardio-pleural friction. At the first careless examination one might think that the sound, cardiac in time, was due to heart or pericardium rather than to pleura, but in most cases we note that the friction in cardiac rhythm is heard, as a rule, only in inspiration and not in expiration, is heard only in the neighborhood of the heart, and, as a rule, disappears when the patient holds his breath. This does not always suffice, however, for in my experience, if I tell a patient to hold his breath he takes a full breath and holds it, and in that condition the cardiac rub goes on. If, however, he empties the lungs, that is, stops at the end of expiration instead of inspiration, the sound disappears, showing that it is due to the force of the heart acting on the inflamed pleural surfaces, and not to any affection of the heart or its appurtenances.

As to any specific medicinal treatment a description of it would be as short as the description of the snakes of Ireland, while a full report of what has been recommended would make a volume. On the theory that pleurisy is rheumatic, the salicylates and other antirheumatics have been recommended. While some cases of pleurisy may be rheumatic, others certainly are not, at least one-third being tubercular, and these certainly would not be benefited by salicylates and other remedies of that class. In my own experience they have failed in the great number of cases to accomplish anything in the way of amelioration or cure, doing no good in promoting the absorption of fluid, and

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little if any in relieving the other symptoms. Fixation of the chest by plasters in some cases seems to afford relief by preventing motion and consequently preventing the painful rub of inflamed surfaces, but in many patients the irritation of the plaster is more complained of than the pain, while the presence of the plaster interferes with accurate examination of the patient.

Blisters make a bad matter worse. It is bad enough to suffer the ills that Providence sends without being tortured by the doctor in addition. As to poultices, they are a delusion and a snare. Even if hot when applied they soon become cold, and the alternation of the hot, slimy nastiness for a cold one cannot do much good, while the interval between the removal of one and the application of the other is fraught with danger to the patient who is uncovered for the purpose of changing. The same objection applies to the use of poultices in pneumonia. We often hear of wonderful results from the use of these things, but these good results are more often *post hoc* than *propter hoc*. In fact they remind me of a story of a friend whose wife had recently been confined. He said they were very much afraid his wife would not be able to nurse her baby. She had no milk. The second day there was still no milk. Finally, on the morning of the third day, the doctor said: "Well, this won't do. We must have her able to nurse this baby any way." He wrote a prescription and they began giving her the medicine, and before night her breasts began to fill up, and the next day there was plenty.

If any external application is used, I know of none so good as cold. An ice coil or an ice bag would often relieve pain and often give great relief. Cold cloths are bad because they make the clothing wet, but that objection does not apply to the coil or bag. Morphine or some form of opiate of course will do better than anything for the relief of pain and should be used freely enough to make the patient comfortable. If an effusion comes on rapidly enough to cause dyspnœa, stimulants may be needed, and some medication may be needed for symptoms and conditions as they arise. If an effusion is large no time should be lost in removing it. The physical signs are sufficient to satisfy us in most cases in regard to this; but if not, a needle thrust into the cavity will soon settle the diagnosis. In nearly all cases where there is an effusion there is a thick plastic exudation on the surface of the pleura. Now, if we wait for the lung to become compressed and the exudate to become organized, we will have a hopelessly crippled lung. The argument has been advanced that if we aspirate early the inflamed surface will immediately pour out a fresh supply, and so no good will be accomplished. Even if this does occur we can aspirate again. It will not take such a great amount of food and drink to furnish a fresh supply of serum. We see too many sunken chests that are the results of too long waiting not to feel convinced that an early interference is the wisest course to pursue. It is not necessary to remove all the fluid, indeed often the removal of a moderately small amount will relieve the pressure and start the process of absorption which will then often go on unaided. As soon as the patient begins to cough or to feel a sense of tightness around the chest it is time to stop. If the physical signs are sufficient to convince us that fluid is present, one negative puncture should not discourage us. The needle may have simply penetrated an adhesion on one of the numerous trabeculæ that are formed, and then of course no fluid would be obtained. If the needle and skin and doctor are clean, there is no danger in making enough punctures to give absolute certainty.

Absorbents, as iodides, etc., are of little avail, though they amuse the patient while we are waiting to see what nature will do. Cathartics and diuretics will accomplish much if liquids are kept from the patient; otherwise they will not do much good. I have seen large effusions rapidly absorbed in this manner, which as rapidly reappeared when the free use of water was allowed, to again disappear on placing the patient again on the dry diet. This combination of drugs and diet will do more than any form of medication; but if the effusion persists or the dyspnœa is urgent, nothing is to be gained by waiting, while much may be lost. It is well if the case is not urgent to wait and see what nature will accomplish, but we should not confound the desire to see what nature will do with what nature will endure. We do not carry out this policy in other cases. In obstetrics we do not wait so long before we use version or the forceps.

In dentistry we pull or fill the offending tooth. In abdominal work we make a laparotomy even for exploration, but in the thorax too many will sit down after demonstrating the presence of a pail of water and wait like Mr. Micawber for something to turn up. If the aspirator shows pus instead of serum the question arises, should we make a free incision or wait. The decision then depends much on the condition of the patient and the character of the pus. If the pus is septic and the temperature is high, the sooner the whole cavity is emptied and drained the better. If not, there is no harm in waiting a moderate time to see if the pus again reforms and the opening can be made.

Years ago we used to hear a great deal about serous effusions becoming purulent after repeated aspirations, and the supposition was advanced that all or most effusions were serous in the beginning, but since the days of asepsis we hear very little of changes of that sort.

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MALARIA.

By Frank S. Johnson, M. D.

Chicago.

Malaria is a disease manifesting itself in almost numberless guises, the typical acute and chronic forms, and the atypical cases in which functional disturbances of extremely erratic nature are its only evidences. It is in the latter cases that the fundamental trouble may easily escape detection.

In my earlier years of practice, malaria was regarded as obsolete in our city by many medical practitioners. The older physicians who had been familiar with its protean forms in the earlier years of the city, recognized its influence, but it was not so with the younger men unacquainted with its mysterious workings. For them there was no malaria without well defined periodical symptoms.

In the past few years, the practical application of Lavaran's discovery has enabled those not favored with broad experience to recognize the obscure forms. Miscroscopical examination of the blood has supplanted the surmises and impressions of other days. But this advance, like every other in science, has opened new fields for research. The causes of the different types, quotidian, tertian, quartan, the chronic forms, the cachexiæ, and the aberrant functional disturbances have been studiously probed and some degree of order seems to be coming out of the chaos that existed before Lavaran shed new light upon the subject.

Many eager workers have followed the development of the plasmodia and noted the pathological effects of the various forms since fifteen years ago the world incredulously listened to the discoverer's first declaration. We now make practical use of his contribution to our exact methods, with the same confidence, and with nearly the same frequency that we do those of the immortal Bright and Professor Koch.

The cases cited in this paper are selected from a hundred or more observed in the past two years, and in all the diagnosis was confirmed or was based upon the presence of plasmodia in the blood. The cases are illustrative of some of the various forms under which the disease presents itself, and include not only cases of frank malarial fever, of the intermittent and remittent types, but cases with marked symptoms. In the latter category must be classed many hepatic and gastro-intestinal disturbances, vaso-motor and nervous derangements, in which no periodicity or other directly indicative symptom could be elicited.

It is not sufficient always to determine that a patient suffers disturbance of function which may, perhaps, be readily corrected, but to thoroughly conquer and prevent recurrence one must know the fundamental derangement, be it vicious habits of living and eating, the systemic poisoning by uneliminated waste products, imperfectly converted waste in gout, toxic products of pathogenic microörganisms in tuberculosis, malaria and other diseases. Complete and permanent restoration may be secured, if at all, only by freeing the organism from the irritant that is disturbing its metabolism. The following cases, however, are in evidence that such attacks occur among the city dwellers, although sometimes the infection seems to have been imported and to have remained latent for months.

CASE I.

An elderly gentleman of previous good health, in January visited New Orleans; had slight bronchitis; well after return; gained ten pounds in weight. Past week not as well; coryza. Slight chill at midnight April 1. Second paroxysm the following night, sharper than the first. Took mercurial cathartic followed by quinine, 18 grains in the 24 hours, and Fowler's solution, 5 drops three times in the day. Twenty-four hours later, again a slight chill. No further recurrence. The blood at first contained many intracorpuscular plasmodia, which rapidly disappeared after the administration of quinine, but were not entirely absent one month later. Patient had taken quinine and pepto-mangan steadily, he then omitted the quinine for two weeks, when large numbers of intracorpuscular bodies were again found. Five days after the quinine and arsenic were resumed the parasites had disappeared. There was no further return.

CASE II.

Child, aged 4½; previous health good except measles within a month of the attack of ague; had distinct chill at 10 A. M. The following fever of 103° lasted more than thirty-six hours, the next evening was still 101°. The blood contained many large and small intracorpuscular bodies and rosettes. Quinine and arsenic were administered. The patient had three chills of lessening severity, and with lengthening intervals. Both of the foregoing cases occurred at the end of a long, cold winter, when the snow was scarcely off the ground.

CASE III.

M., aged 36; general health good; malaria ten years ago in Ohio. During the past five years

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suffered much from headache induced by mental exertion and by bright light. Eyes found to be normal by a skilful oculist. Past summer headache persistent. Six weeks ago had a carbuncle. At that time quotidian paroxysms at bedtime. Says that he has one or two attacks of malaria every year. Blood contained small, multiform, intracorpuscular bodies and free pigment. Cannot take quinine; it produces an intoxicating effect. Was satisfactorily benefited by iron and arsenic.

CASE IV.

F. S., 30, resident of Chicago; not well for several years, but no illness. Last autumn gradual onset of fever of increasing severity. First chill after six weeks of illness; recurred during the following two weeks at not very regular intervals, but strongly suggesting the quartan type. At this period I saw the patient two or three times. The blood contained many small, intracorpuscular bodies and rosetted. Active anti-periodic treatment was followed by improvement. At the height of her illness three severe complications occurred, namely, pleurisy, double crural thrombo-phlebitis and nephritis.

CASE V.

A widow lady of 50, past health only fairly good, had been slightly ill for six weeks, was anæmic and feverish. At first had no chills, but was chilly on slight exposure. Had taken some quinine and arsenic during the month previous. The type became defined in a mild quotidian ague. Had slight cough. Lungs normal. The intermissions were gradually lengthened, the chill and fever less pronounced. The patient recovered very slowly, was confined to bed for more than a month. Has had slight recurrences since that attack.

CASE VI.

The following case was among those referred to by Dr. Quine in a paper read before the American Medical Association, in 1895, and is here quoted.

"Miss H., aged 16 (?) has lived in Chicago many years in a good house and neighborhood. No excavations near. April, 1894, she began to be sick gradually with a continued type of fever marked by irregular fluctuations, which was labeled by the attending physician, Dr. Samuel Cole, 'typhoid fever with malarial features.' The fever continued about four weeks, and then, after an interval of normal temperature lasting a few days, there was a relapse. The patient had taken quinine freely from the beginning. Upon the basis of two examinations made by myself during the month of May, 1894, the diagnosis of the family physician was sustained. Later the blood of the patient was examined by Dr. Frank S. Johnson and the fact of malarial infection, previously assumed to exist, was demonstrated. Quinine was administered with great freedom by the mouth, rectum and hypodermatic method, and arsenic and iron were also pressed systematically, but without affecting the course of the disease. The patient was seen at this time by Dr. N. S. Davis. Her illness continued over four months, uninfluenced by treatment to an important extent, and finally came to be attended with acute pulmonary tuberculosis. Death occurred five or six weeks later, the blood of the patient crowded with plasmodia to the last. Her sputa had been examined for bacilli repeatedly during the progress of the sickness, but none were found till 'between three and five weeks before death.'

"The blood was unusually rich in malarial organisms throughout the disease. There were present small, intracorpuscular bodies and flagelette bodies. In the latter part of her illness medication per orem was not borne by the stomache, and by the hypodermic method was not tolerated by the patient."

CASE VII.

Mr. X., a strong, vigorous man about 35, had always been well until recently. Occupation incurred long hours, early rising and considerable responsibility. Within a few weeks had lost strength, coughed, had night sweats and an irregular, elevated temperature. There were physical evidences of consolidation and extensive bronchitis. The sputum contained very many tubercle bacilli, the blood many plasmodia. He was directed to take creosote, quinine, arsenic, strychnine, and admonished to go west. When last heard from he seemed to be perfectly well. This case differs from the previous one in that although the patient had a severe double infection, and had lost strength rapidly, he was still quite vigorous, and under proper environment made rapid progress towards recovery.

CASE VIII.

A young married lady, aged 29, frail from childhood, confined in June, on the tenth day of the puerperium the temperature rose to 102°. Was of the continued type, and lasted six weeks. There was no discoverable cause in the genitalia for the fever. A condition of feverishness persisted th rough the summer, fall and following winter. The patient had slight cough, but no organic pulmonary disease. She nursed her child. In March, after an exposure, she had a moderately severe attack of pneumonia involving the right lung. When seemingly about to convalesce, fever recurred, without, however, recurrence at first of

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the pulmonary lesion. The temperature variation during the first two or three days was of the quotidian intermittent type; the maxium was 102°.

Small intracorpuscular plasmodia were found in the blood. The fever now became remittent, and more intense; it varied from 103° to 105°. The fastigium was more prolonged. At the end of five or six days, complete infiltration of the previously inflamed lung had occurred and there was œdema of the opposite lung. Death took place one week after the onset of the complicating disorder. In the last twenty-four hours there was delirium.

It is probably not wise to deduce a conclusion when an important premise is assumed, but it would seem that the patient had suffered from malarial infection during the entire term after confinement, and that the debility occasioned by the pneumonia so lessened her resistance that the malarial infection became virulent. The refilling of the lung did not seem to be a return of the specific pneumonic infection, but an effect of the sharp malarial attack. It resembled etiologically, perhaps, intermittent pernicious pneumonia, but with graver organic lesion because of the greater susceptibility of the recently inflamed lung, an outpouring of exudate due to vaso-motor disturbances and effect of the toxæmia on the damaged vessel wall.

CASE IX.

A young married lady, in Florida first half of January, 1895; cholera morbus while south; no chills and no fever. Two weeks later and after an exposure to inclement weather had the general symptoms of an infection and an active diarrhœa. In a few days a double tertian ague developed, two chills occurring in the same day, one in the forenoon and one in the afternoon. The spleen was distinctly palpable. Malarial plasmodia were present in the blood. Under antiperiodic treatment the paroxysms became irregular and less severe, but an evening rise of temperature merging into a rather irregular remittent fever, not presenting distinctly periodic symptoms, replaced the ague. Rose spots appeared on the abdomen and there was ileo-cæcal tenderness. There was no characteristic diarrhœa. The temperature became normal on the twenty-second day of illness. The menses appeared two weeks after the beginning of the illness, and persisted for three weeks. The flow was at times profuse. Once a blood cast of the uterus was expelled. In November following she became pregnant; there was slight reflex nausea. She then had a very mild tertian fever. A distinct chill occurred only once. The nausea was more pronounced on the days of fever.

Malarial organisms were present in the blood. The symptoms subsided rapidly under quinine, arsenic and strychnine. As a case of mixed malarial and typhoid infections, it is interesting first because of the unusual double tertian manifestations subsiding under antiperiodic treatment and replaced by a normal typhoid fever. Further interest attaches to the effect of the infections upon the menstrual function.

CASE X.

F. S., aged 19, former residence in the Illinois River valley. Had lived in Chicago two years. Three months prior to visit spent one week in July at her old home. After her return was quite well until three or four weeks before she was seen, then lost vigor, was breathless on exertion, had grown pale in past two weeks, had had occasional frontal or occipital headaches which were not severe, and lumbar pains, without tenderness. Appetite was poor, but had no subjective gastric disturbance. Had occasional chilly sensations, but no regular periodic symptoms. Had never felt feverish. Menses were regular and normal. Pulse 96, temperature 99°. Face was extremely pale and slightly greenish in color. Had herpes labialis. The lungs were normal. The heart normal except a soft anæmic murmur. Had also a venous hum in the neck. Spleen was not appreciably enlarged. Liver not enlarged. No lymph-glandular enlargements. Blood 35 per cent. hæmoglobin. A few intracorpuscular rosettes. A day later many small hyaline bodies. Was given quinine 3 grains with iron, arsenic and strychnine after each meal. In 12 days the hæmoglobin was 43 per cent. There were very few plasmodia. Two weeks later the hæmoglobin was sixty-two and one-half per cent. Feeling very much better and gaining rapidly.

Another almost identical case occurred in a patient observed at Mercy Hospital.

The following is different in some respects:

CASE XI.

A young lady, 16 years old, well until 18 months before coming under observation. Had had attacks of faintness. For six months had been losing strength, and was always tired. For six weeks very easily out of breath.

Menses regular, but the last almost colorless. Had been in a boarding school in the interior where her duties had been burdensome and the food unpalatable. Was quite hysterical, very pale, pulse 110, temperature 99.8°. The blood contained many small, intracorpuscular hyaline bodies and rosettes. Under treatment the patient gained slowly and unsatisfactorily. Two weeks later was about the same. Was easily chilled, had vasomotor disturbances manifested in causeless flushings of the face. No periodical symptoms. Plasmodia still numerous. Hæmoglobin 40 per cent. Red blood corpuscles 3,000,000 per cubic mm.

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A disproportionate reduction of the red corpuscles and the coloring matter that suggested a fundamental chlorotic anæmia. This view of the case exclusively had been taken by two physicians under whose care she had previously been. Recent advice by letter states that her health is now substantially improved.

CASE XII.

A young married lady, aged 25, for several years has been very anæmic, and has suffered from the attendant derangements. Face often puffy and subicteric. Is habitually constipated. Had had several attacks of diarrhœa, one of which was dysenteric, and had attacks of acute gastric catarrh. She had had hemorrhoids which often bled. She was much annoyed by pruritus vulvæ. She spent the summer of 1894 at the sea shore and while there improved in vigor and in color. The anæmic head symptoms were less pronounced and she had less cardiac palpitation. In December, gradually became ill. There were vaso-motor disturbances, gastric soreness and coated tongue, pulse 120 to 130, temperature 98.8°, was chilly, feverish and felt badly every afternoon. Symptoms subsided with slight perspiration. Spleen was not palpable. The urine was normal. A few small, intracorpuscular plasmodia and rosettes, and a few flagelette bodies were found in the blood. Quinine caused disagreeable cerebral symptoms, but 10 grains were taken at bed time with bromides. Later iron and arsenic were added. There was daily improvement. The plasmodia diminished rapidly in numbers. In March, 1895, the patient had an acute catarrh of the respiratory tract, pain in the stomach, vomiting, recurring periodically, but no appreciable fever or chill. There was an increase in the number of plasmodia. Under treatment felt quite well again until autumn, when she had another less severe attack. The blood then contained a few plasmodia. She was enjoined to take her remedies more faithfully. Has not been heard from since. I believe that her trouble for years was a chronic malarial affection and that the resulting constipation and anæmia intensified the conditions caused by the toxæmia and rendered the patient more susceptible to the varying conditions of her surroundings, and to dietetic disturbances.

CASE XIII.

An elderly lady, aged 63, general health only fairly good. History of diabetes 30 years before which lasted two years. Bleeding hæmorrhoids for 30 years. Operated upon six years before; lost much blood; not as well afterwards. Bowels habitually constipated. Skin naturally inactive. Had an attack called grippe nine weeks before she came under observation, April 12. Had been growing pale the past four weeks. The symptoms then existing began rather abruptly. She complained of ringing or buzzing in the head. Sense of pressure and severe aching. Had had repeated epistaxis. Slight bleeding from the gums, vomiting. The patient was quite stout, but had lost some flesh. Was extremely anæmic; subicteric; the skin unnaturally dry; the tongue coated. The lungs were normal; heart normal; the bowels torpid; dejecta normal. She had an anæmic systolic bruit. The urine was normal but of reddish color and low sp. gr. The spleen enlarged and distinctly palpable. No lymphatic enlargements. The liver was slightly enlarged and quite tender. The blood: hæmoglobin 40 per cent. No leucocytosis. Many small and medium sized pigmented and unpigmented hyalin intracorpuscular bodies, numerous and large free amœboid plasmodia with actively dancing pigment granules. Pulse found usually to be between 90 and 105. Temperature about 98.5° to 101°, usually highest in latter part of the afternoon. No chills, no distinct perspiration. She became more icteric and was annoyed by pruritus. There was insomnia.

The patient was weak, nervous, discouraged and restless. These conditions very much interfered with methodical treatment. The nourishment was carefully selected and administered, but the vomiting continued. Very little quinine could be given by mouth. Suppositories and rectal injections were not well tolerated. Administration by inunction was the most satisfactory, but in the end accomplished nothing and seemed to intensify the general pruritus. The patient also complained much of the bitter taste incident to its appearance in the saliva. Quinine hypodermically caused the patient and the family such distress that it was not very regularly given. Several of the organic iron preparations were used. Fowler's solution was given in two drop doses, frequently repeated. May 6 the anæmia was more profound. The hæmoglobin was 35 per cent. There were many large and small intracorpuscular bodies. Three weeks later the patient died. During her last week of illness she had several chills, recurring irregularly, but suggesting the tertian type. The paroxysms increased in severity. They were influenced little if at all by the hypodermic administrations of quinine. The general features in the above case are fairly representative of those in four others occurring in elderly persons The decline of vigor incident to advanced age diminishes the resisting power. Functional troubles are not as easily corrected, and antiperiodics have by no means the powerful effect on the malarial organisms that is observed in vigorous subjects. In this regard old age may be compared with debility by disease. The following is a similar example in which the malarial infection may perhaps have existed many years and have become evident towards the end of life;

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CASE XIV.

Mr. W., a very old gentleman, had been a very strong and vigorous man, had lived the greater part of his life in malarious districts, and had suffered repeatedly from malarial fevers. For a year or more had been hemiparetic, and had lost vigor very rapidly. In his confinement he had repeated attacks of bronchitis. With his declining strength irregular malarial symptoms developed. The large doses of quinine given probably interfered with the malarial cycles. The bronchitis grew worse. He died of broncho-pneumonia.

CASE XV.

M. M., 36, fairly well until summer of 1894. Gradually lost vigor; occasional pain in stomach, with vomiting and gastric flatulence; bowels torpid; no chills or fever. In January, 1895, he was found to be easily fatigued and somewhat emaciated. His thoracic organs were normal, the epigastrium quite prominent. The spleen was enormously enlarged, hard and of unusual quadrilateral form. The lower margin was nearly horizontal, extending beyond the umbilicus, curving upwards to the right and meeting the lower border of the liver in the extension of the right mamallary line. The surface was irregular and over the marginal zone uneven and lobulated. There was a tender and somewhat soft area in the right epigastric region; liver was palpable below the margin of the ribs. He had no enlarged lymphatic glands. The blood was but little impoverished, hæmoglobin 90 per cent. There seemed to be a slight excess of polynuclear leucocytes, not of other forms. A corpuscular count was not made. A few intracorpuscular plasmodia were found; urine normal. Under quinine, iron and arsenic there was improvement in the general condition, at first gradual and later more rapid. Six months afterwards he was quite strong and vigorous. The splenic tumor was decidedly smaller. It extended scarcely beyond the medium line and below only to within an inch and a half of the umbilicus. He has not visited the office since. The case is interesting in that he gave no history of an acute malarial attack and no symptoms of masked malarial paroxysms were elicited. I have known him as a patient and seen him from time to time since 1888, the last time previous to present illness in 1891. His ailments have been rheumatic and bronchial.

He had resided in Chicago and Milwaukee. Very large splenic tumor is extremely uncommon in the North, but more common in the South. All other similiar cases that I have known of have been imported.

CASE XVI.

M., aged 26, large and strong. Family history rheumatic. In 1894 passed a renal calculus. In June, 1895, pain in the left kidney returned. Urine was bloody, the symptoms irregular, there were intervals of absolute freedom from pain and tenderness. In August pain again returned and urine was bloody. September 1 passed a uric acid calculus, and after it much sand for a week or two. Went to the West for a month, and led an active out-of-door life, rode horseback. While there he had no pain. One week after returning had slight pain and deep-seated tenderness in left lumbar region. Recurred 7 days later, and again in 7 days, the latter accompanied by chill and high fever. The paroxysm was repeated on the following day. No tenesmus or bloody urine. He was well the remainder of the week. On the seventh day again sharp chill, severe pain, high fever, severe vomiting, profuse perspiration, with partial subsidence of the fever. The pain continued but was less severe. The fever, pain and vomiting lasted through the next day without chill. Blood contained many plasmodia. Urine: yellow; turbid; acid; 1020; inorganic salts normal; urea, 1.8 per cent. No albumen, small aggregations of uric acid crystals. Some pus, few granular casts, few squamous and renal epithelial cells. Antiperiodic treatment began. Patient was up in a few days. He neglected his quinine; two days later had a slight chill, vomiting, fever and severe pain in the left lumbar region. The quinine was resumed and the symptoms subsided. During the two following days there was slight fever. The seventh day after the last paroxysm he had a slight chill with return of the accompanying symptoms. It was repeated the second day following, but did not recur again, but fever continued. He was confined to his bed for two weeks. Was then weak but not anæmic. Blood: hæmoglobin 105 per cent., corpscles, 4,500,000 per m. m. Very few plasmodia. Is taking 30 grains of quinine daily with pepto-mangan and arsenic.

Although the destruction of the red corpuscles still continues, as is shown by the presence of plasmodia, and corroborated by the slightly diminished number of red blood corpuscles, the hæmoglobin percentage is rather about normal, due, I believe, to the persistent use of iron, and although the patient felt well, the toxæmia, confinement and limited diet lessened his vigor very decidedly. He now had some pain and tenderness in left lumbar region, and from past experience felt sure that he had calculus in the renal pelvis, although there was no other evidence excepting the small amount of pus that had been present throughout the attack. Before Christmas he returned to the West. Under date of February 4, I learned from his physician in Colorado that while there he had had two or three attacks of renal colic weekly. They had grown in severity and were "accompanied by malarial fever." The urine contained pus, blood and oxalate of lime. He was about to undergo an operation

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when the stone was evacuated per urethram.

In this case the large number of attacks of renal colic occurring before his trip to the West were apparently excited by the malarial intoxication, this adding to the nerve irritation already caused by the stone. The colic ceased temporarily when the infection was brought under control, to return with greater severity. Other more positive symptoms and signs when the stone had caused more injury.

CASE XVII.

A young lady, strong, well nourished, not anæmic, had mild daily paroxyms, occurring in morning and disappearing at noon, without sweats, represented by slight feverishness, supraorbital headache, dizziness, nausea, pains in chest, both back and front, slight cough without expectoration, pain in left arm. Appetite poor, bowels regular, sleep restless, temperature 11 A. M., 100.2°; tongue coated, yellow, pasty. Blood contained a few plasmodia. Cannot take quinine, it causes urticaria. Sister has same idiosyncrasy. Improved satisfactorily under Fowler's solution with acid nit. nun.

CASE XVIII.

In an elderly lady an attack of herpes zoster was preceded by neuralgic pains in both shoulders and both sides of the chest, associated with chilly sensations and slight feverishness; no history of regular periodicity was elicited. The eruption appeared in the right scapular and axillary regions. Malarial organisms were found in the blood.

CASE XIX.

M. S., aged 24, a strong, vigorous man; printing pressman. His ailment had existed two months. The onset was gradual, with headache, loss of appetite and constipation. Each afternoon he was feverish and had slight abdominal pain, nausea and vomiting. These symptoms subsided in four or five hours, with light perspiration. After some days the pain became unendurable, recurred every day, but was ushered in every second day with a chill. The fever on these days was higher, the vomiting violent, but the pain alike each day. The attacks subsided with perspiration.

The case presented itself clearly as a double tertian infection, recurring on alternate days at the same hour, with the somewhat remarkable incident that in one train of the infection the paroxysms were ushered in by chills and in the other not, and that the pain seemed equally severe in every instance.

The patient at that time was in charge of his family physician. Under the administration of quinine the chills no longer recurred and the vomiting stopped. Fever and sweating stage continued every second day for two weeks and then stopped. The pain returned daily, however, at 3 P. M. Point of greatest intensity was in the epigastric region and extended along the lower intercostal nerves. The whole tract was tender during paroxysms. In the intermission tenderness was found only at the focal point. Patient is tall, spare, pale; tongue slightly coated, appetite poor, bowels constipated, sleep restless, tired in the morning, spleen moderately enlarged, pulse 72, temperature 99.2° in the forenoon. Blood examination reveals a few intracorpuscular bodies. Further history of the case not known.

Iron, arsenic and strychnine and a laxative were added to the medication.

CASE XX.

A young married lady, aged 27, lived in a malarious district prior to a few years ago, then in New York city. Had had fevers. While in New York had several attacks of severe anæmia. The day before leaving for Chicago was severely exposed to a cold, stormy night in February. There developed soreness of the throat, and general febrile symptoms. On arriving in Chicago was suffering with a sharp attack of follicular tonsillitis. Had slight fever, but complained especially of a very severe headache. The urine was somewhat scanty, specific gravity 1030, urea 3 per cent. no albumen casts, or abnormal constituents. The pharynx improved satisfactorily under salicylates and the local use of a mercuric chloride and carbolic acid solution, but the headache was intractable. Temporary relief was secured by morphine. The patient was anæmic and subicteric. The temperature elevation was slight throughout the attack, less than 100°, and remained quite constant. On the fourth day a blood examination revealed numerous intracorpuscular hyaline bodies. In deference to the patient's disinclination to take quinine, it was given in small doses of three grains three times daily, with increasing doses of Fowler's solution. In twenty-four hours the headache, which had resisted salicylates, purgatives, phenacetine and bromide, antipyrine and caffeine, had disappeared completely, and she slept well for the first time in a week. The attack was followed by moderate, painless, reddened œdematous swelling of both ankles on the anterior surfaces and internal malleoli. It subsided in a few days. The patient continued to gain in health under quinine, arsenic, iron and strychnine. Some months later she had mild attacks of pain in the lower and right portion of the abdomen, coming on suddenly or gradually, with slight chill and feverishness, but never marked disturbance, and never perspiration. Physical examination was negative, bowels torpid and the dejecta light colored. The

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urine normal, not bile stained. The blood contained a few small, intracopuscular bodies, resembling æstivo-autumnal forms.

The periods of observation in this case did not extend over the whole course of the disease, but there can be no doubt that for years she had suffered from a chronic malarial infection; that her repeated attacks of anæmia were of malarial origin; that the exposure and illness lowered her resistance to the toxæmia. The infection persisted afterwards and asserted itself more acutely from time to time in vague general disturbances, and in gastro-intestinal derangements. The attacks of abdominal pains I believe were mild biliary colic.

The notes of this case were furnished by Dr. Quine for his paper already referred to. The next was also given. His notes are quoted here:

CASE XXI.

"March, 1895. Mrs. C., aged 55; has lived in Chicago forty years and in her present home fifteen years, and has not been out of the city in three years. There are no excavations in the neighborhood. The patient was perfectly well until early in January. At that time, upon awakening one morning, she found her feet red, swollen and painful, and her left arm and leg numb and weak. The paræsthesiæ have continued, but have been inconstant as to intensity and location—absent at times and now limited to one side and then to the other. The redness and swelling of the feet disappeared in twenty-four hours, to be followed by a crop of raised, infiltrated, tender erythematous spots, varying in size from that of a silver quarter dollar to that of a five cent piece, which lasted several days and left blood stains. Successive crops have appeared at irregular intervals, and the individual spots show all stages of development and decline. Five days after the onset of the sickness the patient developed a tertian intermittent fever, but this did not seem to make any impression on the rheumatoid phenomena or the erythematous nodes. Spleen was enlarged; bowels torpid; tongue coated; skin anæmic and sallow. Examination of the blood discovered small, endoglobular bodies containing pigmented particles in active motion. Under antimalarial treatment the rheumatoid pains disappeared; the erythematous nodes continued but were lessened in number, but the chills and fever were not benefited. At the end of three weeks of such experience the patient decided to stop treatment."

A noteworthy feature in this case was the varied symptoms. How far we may ascribe them to the malarial infection is open to discussion. The thermatoid and purpuric phœnomena suggest another disease with which we are acquainted clinically and by name but the cause or causes of which are open for study and speculation. A peculiarity in this case was the partial disappearance of some of the phenomena, but the persistence of the more destructive periodic phases while under antiperiodic treatment.

These cases illustrate the erratic nature of malarial disturbances and the varying effect of infections under different conditions. In several there was change of type from a continued or remittent form to an intermittent, having a tendency to increase in severity. Some demonstrate the impotence of quinine in much debilitated subjects, while on the other hand, in one case at least, it acted with such startling efficiency as to suggesan effect of a physiological antidote to the malarial poison in addition to its germicidal effect on the organisms. Other similar cases might have been cited, to-wit, many instances where quinine in large doses of 30 to 40 grains daily did not produce cachexism until after two or three days in individuals who, when well, were quite sensitive to its effects.

The fact that plasmodia were found in the blood after the apparent return of health cannot be adduced to support that idea, inasmuch as it may well be due to the normal resistance to the poison.

The anæmic cachexia accompanying malaria is in young women difficult to distinguish from chlorosis. In some instances, I believe, the two maladies are associated, but in others I feel sure that the illness is not a combined effect.

The importance of careful microscopic examination of the blood in obscure cases of illness cannot be overestimated. It is futile in many instances, but invaluable in others. We must not assume, however, that antimalarial treatment will correct grave functional derangements, even when these are primarily due to the disease.

Permit me, gentlemen, to heartily thank you and your President for kindly inviting me to meet with you.

THE PHYSIOLOGY OF DIABETES.

By R. O. Beard, M. D.

Minneapolis.

An apparent contradiction lies in the title of this paper in the idea of the physiology of a pathologic state. Yet there are reasons which not only justify the adoption of this phrase, but demand the treatment of this topic from a strictly physiological point of view.

Diabetes, not unlike Bright's disease, was once a term descriptive of a supposably distinctive malady. Not unlike its nominal associate, again, it has been evolved into a term suggestive of a group of disorders related by certain symptoms

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common to the individual members of the group. Indeed, the word "diabetes" can no longer be used with even so much of definity as attaches to the term "Bright's disease." For the latter, at least, localizes the disorder, whatever pathological characters it possesses, in the kidney. The former is merely a name without even a known local habitation. But *one* symptom binds together diabetic forms of disease and that one is glycosuria. A slender thread of relationship it is, after all, and one which will bear little of the weight of investigation. It is woven out of a single fact—the fact that an excess of sugar cannot remain in the blood; that whenever, from whatsoever cause, that excess of sugar appears in the blood, the selective action of the renal filter is at once excited towards its removal.

The key to the study of all forms of diabetes lies hidden then in the question: why and whence comes this excess of sugar in the blood? And this is, essentially, a physiological question.

Although it is one that cannot be fully answered until we know more than we know now of the metabolism of the tissues, so far as the carbohydrates are concerned, yet we are in possession of a few facts which have a suggestive value and which promise to afford the material for new foundations upon which the pathology and, perhaps, the therapeutics of diabetic conditions may be rebuilt.

These few facts may be best and most briefly stated in the form of propositions, from which some arguments may be drawn:

(1) Diabetes, whatever its form, is, in a peculiar sense, a functional disorder. This is not to relegate it to that nondescript class of so-called *idiopathic* diseases. The word idiopathic, indicative of nothing but our ignorance of, or inability to discover a lesion, should be put into the category of obsolete terms. But it is simply to say—that whatever and wherever the lesion which leads to the large appearance of sugar in the blood, diabetes means a partial or a complete, a local or a general disturbance of a metabolic function which is common to all of the tissues of the animal body. Sugar and its physiologic twin, glycogen, are found in every tissue and they enter intimately into its life history. Normally sugar is present in small but quite constant quantity in the blood.

(2) Diabetes in any form, other than merely temporary glycosuria, is always associated with more or less marked disturbance of nutrition. Even the lactosuria which almost always follows parturition, is suggestive of the active nutritional changes which are going on in the organs of generation and, still more, in the mammary gland.

(3) Our present knowledge of the physiological chemistry of the carbohydrates points us very strongly to the conclusion that the formation of glycogen is a phase of the metabolism of sugars. Fats produce no glycogen; proteids little; carbohydrates much. An increase of carbohydrate food, whether in the form of starch, of cane sugar, of dextrose, maltose, lactose or any other sugar means a definite increase of glycogen in the tissues and not an increase of sugar in the blood. Decrease of the carbohydrates of the dietary leads to a diminution, not of the sugar of the blood, but of the glycogen in store.

(4) Glycogen is, seemingly, the storage form of the carbohydrate fuel of the tissues and it is stored, preëminently, in the liver. Starvation rapidly diminishes this hoarded supply.

(5) In whatever form the carbohydrates are injested, they are absorbed as sugars and, principally, as maltose. The sugar of the blood is, however, normally dextrose. Somehow, in the process of the removal of the sugar from the alimentary canal into the blood of the portal vein, the principal avenue of its absorption, this change takes place. The change is seemingly a necessary antecedent to the conversion of sugar into glycogen. What other steps are involved in the process we do not know. The agent by which they are affected is not yet known. There are some reasons, of which more may be said presently, which tend to encourage the belief that this agent is supplied by the pancreas, quite independently of its digestive powers.

(6) Of the destiny of glycogen we do not know so much. Says Noel Paton: "That glycogen is in part, at least, converted into glucose (dextrose) and in this form sent to the tissues, has been demonstrated beyond doubt by various observers."* It is easy of conversion into sugar (maltose) under the influence of the amylolytic ferments and into dextrose by the action upon it of mineral acids. It readily changes into sugar in the dead liver. There is some reason to think that glycogen is also a progenitor of fat.† Clinical, pathological and experimental evidences point to the fact that a disturbance of glycogenic function means the consequent appearance of sugar in the blood and therefore in the urine. That this disturbance is not always in, or confined to the liver seems evident.

In certain forms of diabetes the increasing elimination of sugar is accompanied by a diminution of glycogen in the liver, and probably elsewhere. Diabetic puncture, *i. e.*, the appearance of sugar in the urine as the result of puncture of a point in the floor of the fourth ventricle, is not effective if glycogen is absent from the liver.

(7) Whether in the form of glycogen or sugar, carbohydrate material has a constructive relationship to the tissues. The universal presence of sugar in the tissues; the constancy of its quantity in the blood; the large quantity of glycogen, to the extent of sixty per cent. of the dry solids, in

**Journal of Physiology*, March, 1896.
†Ibid.

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the fœtal muscles of early development; its presence in the border cells between the maternal and fœtal structures of the placenta; its existence in the active cells of the mammary gland; its marked presence in cartilage cells undergoing osseous change; its immense storage in so essentially a metabolic organ as the liver, all indicate that these materials lie along the path of a constructive metamorphosis of the tissues. Vaughan Harley has shown, too, that the ingestion of sugar, in notable quantity, increases muscular power and favors resistance to fatigue,* a proof of its food relationship. The idea suggested by certain observers that diabetes occurs because of the absence or failure of a ferment designed to *destroy* sugar in the blood or in the tissues, is contradicted by the facts of carbohydrate metabolism, so far as we possess them. It may well be that the phrase "destruction of sugar" employed in this relationship, is used where "conversion" is meant, but its use is unfortunate since it is certain to be associated with the idea of katabolic change.

And now, to what degree do these physiological facts illuminate the clinical study of diabetic conditions? It follows from the propositions stated—and these will be admitted to be beyond controversy—that any disorder of digestion which prevents the due preparation of carbohydrates for absorption; that any failure of the absorptive process, with its incidental but important changes in the sugar-forms; that any arrest of the conversion of dextrose into glycogen; that any alteration in the stability of the storage glycogen by which it is unduly reconverted into glucose; that any step dropped in the metabolic path by which either glycogen or sugar is led up into tissue; that any retrograde metamorphosis, even, by which tissue in itself produces sugar, will give us an excess of sugar in the blood and the consequent appearance of sugar in the urine.

These varying possibilities, any one of which may mean an interference with some step in the glycolytic metabolism, are the measure of the many forms of diabetes which may occur and, at the same time, of the variant degree of gravity which they may possess.

Experimental results confirm these suggestions, so far as they have gone, and we are only yet at the birth of the problems with which these experimental attempts are pregnant.

Feeding with a large excess of carbohydrate food and thus exceeding the digestive capacity for full elaboration, leads to sugar in the urine—a temporary glycosuria.

Minkowski, von Mering, De Renzi and others, in a very brilliant series of experiments, have shown beyond question that complete extirpation of the pancreas in dogs and cats—an operation attended with great difficulty—will almost invariably produce diabetes. These results have been satisfactorily confirmed in the physiological laboratory of the University of Minnesota, under my own charge. Within five hours of operation sugar has been found present in large quantity in the urine. It has been shown that ligature of the pancreatic ducts will not produce this result, proving that this diabetes is not due to disorders of digestive function for which the pancreas is responsible. Minkowski has shown that the quantity of sugar which appears in pancreatic diabetes is dependent upon the kind and quantity of sugar-forming foods, which suggests at once that the extirpation of the pancreas has a deterrent influence upon glycogen-storage in the liver. If but a minor portion of the pancreas is removed diabetes does not ensue; if but a minor part is left, partial and less constant diabetes is observed; varying, again, in degree with the quantity of carbohydrate food ingested. Transplantation of the pancreas or of a major portion of it has the remarkable effect of diminishing or arresting the pancreatic diabetes.*

In the experiments I have so far conducted, with the assistance of my colleagues, Dr. J. Clark Stewart and Dr. F. F. Wesbrook, marked pancreatic diabetes has been observed in two animals, starved for from twenty-four to thirty-six hours prior to operation and refusing food for from one to three days thereafter. This observation further suggests that the removal of the pancreas not only interferes with glycogen storage, but probably induces a reconversion of the glycogen, already formed, into sugar. Minkowski makes the observation, which falls directly in line with the above conclusion, that the liver of an animal which has suffered extirpation of the pancreas rapidly loses glycogen. He has found, too, that when the liver of the goose has been extirpated sugar rapidly disappears from the blood. The soundness of this argument and of the inference that some agent produced by the pancreas is a normal influence in determining glycogenic storage in the liver, and that, in its absence, glycogen is either unformed or unstable, is indicated by the experiments of Kaufmann,† who has shown that when the portal blood supply is diminished or cut off, the supply of sugar in the blood progressively lessens, and this, not only in normal blood, but in the case of pancreatic diabetes.

In other words, diabetes which has been caused by extirpation of the pancreas seems to be arrested by ligature of the portal vein. Whatever it is that the pancreas conserves, whatever its removal sacrifices, is conserved or sacrificed, then, in the liver. The nature of this sugar-metabolising product of the pancreas is practically undiscovered. Professor Torup, of Christiania, has used an extract of the pancreas subcutaneously with the re-

**Journal of Physiology*, January, 1894.

* *Archiv. f. exp. Pathol. u.* Vol. XXX, 1, pp. 86-189.

† *Archives de Physiologie*, Jan. 1896.

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sult of relieving pancreatic diabetes, but this simply proves its effect and not its nature. Certain of these experimenters believe this agent to be a ferment, and the view is a tempting one; but the idea, suggested by Lepine, to which allusion has already been made, that it is a sugar-destroying ferment, is altogether untenable, since there is positively nothing in the history of the metabolism of sugar to indicate that it is undergoing anything but a constructive metamorphosis—that it is, in a word, anything but a tissue food.

To quote, in somewhat free translation, from Kaufmann: "The facts are not reconcilable with the doctrine according to which diabetes is the result of a diminution of the destruction of sugar. They are, on the contrary, in perfect accord with the other doctrine, which attributes the excess of sugar in the blood of diabetics to an exaggerated formation of that substance in the liver." But let us beware of too rapid generalizations.

This, again, is not the only form of diabetes. Pancreatic diabetes is doubtless a variety of the hepatic disorder. The one organ probably affects the glycogenic metabolism of the other. But it is only one form of hepatic diabetes. The glycosuria which follows diabetic puncture is an experimental illustration of hepatic disturbance produced through the nervous mechanism. This is proved by two facts: 1st, that it does not occur when glycogen has been previously starved out of the liver; and, 2nd, that it is inoperative when prior section is made of the splanchnic nerves supplying that organ.

Again, a temporary glycosuria follows whenever the blood supply of the portal vein is increased; as, on the other hand, sugar diminishes in the blood when the tide flowing through the portal system is lessened.

Nor is pancreatic diabetes the only *fatal* type of the disease. In only about 50 per cent. of the autopsies made in cases of death from diabetes has any lesion of the pancreas been discovered. In many of these cases it is doubtful whether the fatal result is not largely due to the marasmus which the loss of pancreatic digestion entails. In dogs, whose pancreas has been extirpated, death apparently results in most instances from marasmus.

There are good reasons for the belief that another and even more fatal type of diabetes should be differentiated—a trophic diabetes, of rapid progress, with marked neurotic symptoms, and in which the carbohydrate metabolism of the tissues at large is probably perverted.

As indicative of these conditions, autopsy has discovered, in many cases, no pancreatic lesion, has shown an abundance of glycogen in the liver, with no indication of hepatic disorder; while, during life, the patient has voided immensely larger quantities of sugar than a diabetic diet would afford or than the most active glycogenic conversion could account for, and has exhibited all those symptoms of polyphagia, "air-hunger" and rapid emaciation which indicate the violence of the metabolic strife that is being waged within the tissues. For the causation of this type of diabetes we may not be able to account satisfactorily until our knowledge of the trophic functions of the nervous system is more exact.

Pathology will have to companion physiology closely in the study of this subject before this fragmentary chapter upon the etiology of diabetic conditions can be made complete.

A PLEA FOR ENFORCED CARE OF INFECTIOUS DISEASES IN HOSPITALS.

By A. C. Taylor, M. D.

Duluth.

The end and aim of all medical science is the conservation of human life and the relief and lessening of human suffering.

Disraeli says: "The health of the people is the first duty of the statesman." If this be true of the statesman, how much more is it true of the physician, whose entire time and energies are spent in the care of the health of the people. No one understands and appreciates this better than do the physicians themselves, and it is by their individual and combined efforts that the rapid advancement in the various branches which unite to form the science of medicine has been made—efforts not made so much for self advancement or personal gain as for their love for and desire to serve their fellow men. While this advancement has been great in all directions, there is probably no branch of the science which has more rapidly advanced, nor in which more advancement needs still to be made than in that of sanitation. We are beginning to understand that to prevent sickness is better than to treat it, even though we may be able occasionally to cure it.

Sanitary science is a very important branch of medical education, and it would be well for the profession in many instances were it to spend more time in seeking how disease might be prevented instead of searching so diligently for remedial measures, where such measures are so often of little avail. Not but that much has been done and is being done in this direction. But shall we be satisfied until all is done that can be done? Shall we rest content with half-way measures which only partly fulfill the object for which they are intended?

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There are many diseases which we are not able to cure. There are few which are strictly non-preventable. As an illustration of what may be done by a proper use of the knowledge we now possess we have but to look at the decrease in the death rate from small pox in the German army since vaccination has been enforced, and the lessening of typhoid fever in the city of Munich, Bavaria, by improved sanitation, with which you are all familiar. (In 1859 the mortality was 24.20 per 10,000; in 1884 1.75 to 10,000 inhabitants.)

But the object I have in view is to bring to you a thought in regard to the prevention of those terrible scourges of youthful life, scarlet fever and diphtheria, diseases which we are forced to admit we cannot cure, and yet which ought not, with our present knowledge of their etiology, to be permitted to exist; diseases which yearly destroy thousands of our children, solely through the carelessness and indolence of the people and the physicians. It is asserted on fairly good authority that with our existing knowledge of the disease and the enlightened condition of the people small pox could be greatly restricted without the aid of vaccination, and there is no doubt in my mind, and I shall attempt to demonstrate by statistics, that these two scourges named, scarlet fever and diphtheria, may be so restricted as to be practically eradicated, in so far at least as to prevent any outbreak of the diseases except by importation.

That the present methods employed for their restriction are grossly inadequate is patent to every observer. That they do good cannot be doubted, but that they fail to do what they attempt, viz: the isolation of the patient and his attendants and the thorough destruction of the contagium is also beyond a doubt. That they do good is shown by the following facts taken from the Annual Reports of the Michigan State Board of Health. That they do not do more good rests entirely upon the fact that they are imperfectly done. Dr. Baker, Secretary of the Board, in his report for the year 1890 has tabulated the following statistics for the five years preceding his report, which I take the liberty to quote:

"Whole number of outbreaks of scarlet fever reported in the state, not including the two cities of Detroit and Grand Rapids, 1,800.

"Whole number of cases, 14,760.

"Average number of outbreaks per year for five years, 360.

"Average number of cases to each outbreak, 8.2.

"In seventy-two outbreaks in which disinfection and isolation were both neglected the average number of cases occurring in each outbreak was 16.78.

"In fifty-two outbreaks where isolation and disinfection were both enforced (in the usual way) the number of cases to each outbreak was 2.69; where disinfection was enforced and isolation neglected (11 outbreaks) the number of cases to each outbreak was 5.6; where isolation was enforced and disinfection neglected the number of cases to each outbreak was 3.34."

I gather from the same source that in 309 outbreaks of diphtheria, in seventy-five the origin was traced directly to other cases. And there is no doubt that all outbreaks were due to contagion in some manner.

In this disease where isolation and disinfection were both neglected the average number of cases in forty-one outbreaks was 11.66; where isolation and disinfection were both enforced it was 1.56; where disinfection was enforced without isolation the average number of cases to each outbreak was 6, and when isolation without disinfection was enforced the average number of cases was 3.1.

This shows conclusively that isolation even when imperfectly done has a very decided advantage over disinfection in preventing the spread of these diseases, and that isolation and disinfection will materially lessen the number of cases even after the outbreak has occurred; the difference in their favor being almost as one to eight. And this difference is largely increased when we remember that every case occurring in any locality greatly increases the chances of an outbreak in some remote locality by transportation of the germs. In 1889 there were in Michigan 379 outbreaks of diphtheria, with 1,986 cases, or an average of 5.28 to each outbreak and 418 deaths. I shall not weary you with the details of numbers, but will quote Dr. Baker's own words in regard to the utility of restrictive measures: "The above table seems to indicate that if no restrictive measures had been taken in the 379 outbreaks (of diphtheria) and the average for all outbreaks had been 11.66 cases and 2.63 deaths per each outbreak as in the 41 outbreaks in which no restriction was practised, there would have been 4,384 cases and 989 deaths. Deducting from these 1,986 cases and 418 deaths which actually occurred, there is indicated a saving of 2,396 cases and 570 lives from diphtheria during the year 1889 by isolation and disinfection," imperfect as it is. "But," he says, "had the measures of restriction been enforced in each of the 376 outbreaks as they were in each of the 63 outbreaks the number of cases would have been only 586 and the number of deaths 83. Deducting these from the number of cases (1,986) and deaths (418) which did occur there is indicated to have occurred 1,400 cases and 325 deaths from diphtheria in 1889, which could and should have been prevented. To the officers and local boards of health who have failed to conscientiously and vigorously enforce these restrictive measures these 1,400 cases and 325 deaths which might have been prevented must awaken keen regret and must plead eloquently for increased care and diligence in the future."

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It is evident that all that is necessary to eradicate these diseases from any locality or to prevent their occurrence is to *completely* isolate and *thoroughly* disinfect. Let us ask how is this done at the present time, and, if imperfectly, how can it be better done? The present mode of isolation, as you all know, is to tack a card upon the dwelling where the disease occurs informing the public that there is a case dangerous to public health confined therein, and then to inform the family that they are quarantined and must not leave the house. The first proceeding merely advertises the fact to the public, and those possessed of a morbid curiosity and those whose boast it is that they are "not afraid of disease and never catch anything," promptly, though sometimes secretly begin to drop in to satisfy their curiosity or display their bravery, while the head of the family, with true American characteristic disregard for authority or the rights of others, leaves the sick room, where, perhaps, he has attended the patient all night, and goes to his place of business mingling with the public as usual. In all my years of practice I cannot recall a single instance where isolation by this method has been any more perfectly done than that I have just described, while disinfection. as usually performed, is equally imperfect and ineffectual. The following cases will illustrate the working of the present system of restriction: A little girl was taken with scarletina; the acute stage passed off and the physician ceased his visits; nephritis with dropsy set in, convulsions suddenly developed and the child died. Two neighbor women, both having children, offered their sympathies and their services in arranging the little body for burial. Four days later scarlet fever developed in both families, and within a week two more corpses were added to the list of victims of ignorance and carelessness.

The second case to which I refer occurred in the family of a minister. The child came down with diphtheria. As soon as it was discovered, the rest of the children were promptly cared for outside of the family. After the death of the first case, which occurred quite promptly, the house was cleansed and fumigated in the usual way, and the children returned home. Within a week another child was attacked, and the remaining children scattered to the neighbors. This second child also died, and two families to which the children were taken became infected by the disease developing in the children after they were received in their houses.

Cases like the above are so common as to be familiar to you all, and they illustrate sufficiently well the failure of the means ordinarily used to prevent the spread of these diseases.

The question, then, is, how can this be done more effectually than it is now done? The answer is, by establishing hospitals for contagious diseases and compelling every patient to enter one as soon as the disease has been recognized, and oblige him to remain there until all danger of infection is past.

Of the necessity for the establishment of such hospitals there can be no difference of opinion. Of the feasibility of the scheme there may be some doubt. I believe our statutes will uphold it, and it remains for us, as guardians of the public health and teachers in the science of sanitation, to so instruct and enlighten the public as to receive their approval and coöperation. In fact, I believe we must needs be careful that the laity do not outrun us in this matter, and reach the point of demanding better protection from these diseases while we are yet hesitating what method to pursue.

Speaking upon the subject of prophylaxis and of the difficulties in the way of accomplishing it, Dr. Burnett, in his "System of Diseases of the Ear, Nose and Throat," on page 365-6 of Vol. II, refers to a pitiful case occurring in a five-story tenement house, where, in two small rooms, were grouped together five healthy children, penned up with a case of malignant diphtheria, reminding him, he says, of the "penned-up calves or sheep in an East Side slaughter house." Two children from this family were attending the public schools, and Dr. Burnett very sensibly recommends a system of daily medical inspection of all children attending public schools. I would like to ask how long those children, or any member of that family, would have been allowed to remain in that house had the disease with which they were afflicted been small pox instead of diphtheria, and if, having small pox, they should be hurried off to a pest house, why should they not be treated in a similar way when afflicted with a disease possessing all the virulence of small pox, both as regards infection and rate of mortality? If it is an act of negligence to fail in confining small pox patients and suspects, it is equally a mark of neglect to allow a diphtheria or scarlet fever patient or suspect to remain at large. If it is lawful and right to restrain the homicidal insane, it is equally right, and should be equally lawful, to place the same restraint upon those who are far more dangerous to their fellow-men than is the alien with homicidal tendencies.

If our statutes are not so constructed as to provide such restraint, then let us have them reconstructed. If our municipal authorities have not the power to protect the lives of innocent and unsuspecting citizens, let us see to it that that power be given them, even though we have to go into our legislative assemblies and demand the enactment of proper laws.

Of the plans and workings of such a hospital I shall only give a brief outline. It should be owned by the county, city or town, as the case may be, supported by the general tax and controlled by the board of health. Attendance upon it should be compulsory in all cases. It should be built on the pavilion or cottage plan, with a separate building for each disease and one for the steward or

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matron, who should be resident and have a general oversight. Each patient should be permitted to retain his own physician and nurse, and should be required, when able, to pay a reasonable sum for the accommodation received. In case of indigent patients the municipality should assume the entire charge.

Now, gentlemen, I have brought this subject before you in an imperfect and random way, to be sure; nevertheless, I hope that it may be deemed worthy of discussion. If there are any objections to be urged against it, or anything in it which merits approval, I shall be interested in hearing both. I believe we ought not to rest until we see such an institution equipped and in full operation in every city and incorporated town in our state, and I sincerely believe that this plan, if thoroughly carried out, will operate to the saving of many lives.

THE TREATMENT OF PLEURISY.

By A. W. Stinchfield, M. D.

Rochester.

Pleurisy is a disease in which the treatment becomes a matter of exceeding importance, for, as we have been told, while some cases are so very mild that they go on to perfect recovery almost without medication, others are followed by suffering, deformity and even death.

The object of treatment is to so modify and change the difficult and dangerous cases that they shall give results more like the milder ones. A variety of essential causes has been found, and to some extent making out the cause will indicate the proper treatment.

All pleurisy patients should be kept quietly in bed.

In quite a large percentage of cases we will recognize exposure to cold under unfavorable circumstances as an active exciting cause, while some eminent authorities tell us that with rheumatism, in frequency of attack and extreme importance the pleura ranks next to the endocardium.

In such cases the onset is sudden and violent, attended with marked constitutional disturbance and extreme pain, which becomes our first object of treatment. Here opiates and hot applications come at once to mind. Then we are told that brisk catharsis, followed by the liberal use of salicylates, just as in joint rheumatism, is followed by the same prompt relief and favorable outcome. I can bear testimony that in some of this class of cases under salicylates the pain has yielded sooner and the effusion has passed away more promptly and fully than had been accomplished under previous plans of treatment.

A few years ago some celebrated physicians made observations upon a large number of pleurisies in the hospitals of Paris, which resulted in the conclusion that nearly all had tuberculosis for a cause. Whether this is true or not in Minnesota the disease has crept on insiduously, and you are surprised to find sign, of fluid in the chest where, perhaps, you were examining to carry out a rule of thoroughness rather than with any expectation of finding anything abnormal, for in such cases often the symptoms have very little to suggest.

Here we will think of a tubercular cause, and, if we are able to confirm it with family history or deposit in some other part, we may feel certain that we are right in our conjectures, and our medicinal treatment will be directed to supporting the patient and a modification of the tubercular process, exhibiting such remedies as guiacol, cod liver oil, etc. With such patients the pleurisy often passes away very kindly, to be followed later by a history that confirms our early diagnosis.

Bright's disease is another potent cause, and should receive proper treatment to control our pleuritic effusion. The derivative action of free secretion has been deemed of great value in limiting the amount of the effusion or in carrying it away after it is poured out, but here, as usual, we will have to decide whether we must give preference to the skin, the kidneys or the alimentary track.

Let us not overdo the matter by trying to stimulate all into extra activity at the same time. The absorbents are to be considered; iodide of potassium internally and mercurial inunction over the seat of trouble have been used by many and much lauded by some.

To most of pleurisies there comes the question of evacuation through the chest wall, and often when shall we aspirate becomes the all-important consideration.

In many cases even with moderate effusion, if after waiting a proper length of time we observe by means of physical signs that the absorption goes slowly or halts entirely, the drawing off of even a few ounces will often stimulate to renewed activity for a few days, when the operation can be repeated, thus securing a result with less adhesion than if a larger amount had been evacuated at one time.

If we find one side of the chest full or a like amount in both sides with double pleurisy, there should be no delay, and sometimes with much less effusion there comes distress in respiration and embarassed heart's action, and sudden death may take place unless prompt relief is afforded by immediate aspiration. There are some precautions needed: We should not evacuate too rapidly or too fully. If a feeling of distress and constric-

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tion occurs during the operation, desist at once as it is a danger signal and fatal results have followed not heeding the timely warning.

The best location for the puncture is said to be about two inches outside of the border of the pectonalis major at the upper border of the sixth rib, left side; fifth on right side. Dr. Bowditch selected a lower point.

If in doubt whether we have an empyema, explore with a large hypodermic needle. Should this not yield results, make use of a good big aspirating needle. In case we find fibrinous or seropurulent effusion and a chronic history indicating that we have the work of the bacilli tuberculosis, even if we fail to find the germ, we can treat it as a cold abscess by iodoformization.

If the pus is thin and white and a history pointing to the mischief of the pneumococcus, a microscopic examination will make us certain, for as the pneumococcus has a short life, our failure to find the germ is evidence that it is a non-resistant one. Hence, as suggested by Dr. J. H. Dunn in his admirable article in the NORTHWESTERN LANCET* on "Purulent Pleurisies," especially in children and even in adults, there is much less need of a radical operation, and simple incision or even aspiration has succeeded.

But in the majority of cases of long standing, whether in children or adults, which are due to more resistant germs, such as the streptococcus, where the pus is thick and walled in, nothing short of immediate good free drainage should satisfy us, and usually in old adult cases this can only be accomplished by the excision of parts of ribs, which not only aids permanent drainage, but the falling in of the chest wall to close the cavity space.

Make a good, long, curved incision down to the ribs, turning back everything, draw your knife through the periosteum lengthwise of the rib in its middle line, carefully dissect it away, cut out one or two inches of the bone of one or as many ribs as will best serve your purpose. Make an incision in the middle line of the periosteal covering, push in a pair of hæmostatic forceps, open the blades sufficiently to admit an exploring finger, drain off the fluid, provide for permanent drainage by the use of two moderate sized tubes, apply free aseptic dressings and put your patient to bed.

In regard to the future treatment, especially irrigation, there are honest differences of opinion, some urging that it is unnecessary and that serious dangers and even death have resulted from irrigation with simply sterilized water, and that increase in temperature and exaggeration of all bad symptoms, as a rule, follow irrigation.

While others feel that it is a necessary part of good treatment, and that to fail to irrigate is to neglect the best interests of the patient, our method has been not to irrigate unless directly indicated.

We will occasionally meet a case of old and extensive cicatrization due to mixed tubercular and pyogenic infection, which is best treated by Schede's method, which consists of large exposure and removal of the ribs, costal and even parietal membrane closing down the chest wall.

Persevering after treatment for several weeks, or even months, is often required to complete the cure. In many cases reinflation of the compressed lung may be promoted by careful but persistent gymnastics.

* Vol. XVI, page 1, January 1, 1896.

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THE DIFFERENTIAL DIAGNOSIS OF ASCITES.

By George W. Webster, M. D.

Chicago.

The scope of this paper is intended to outline a method rather than to teach new facts, as method makes us independent of facts, enables us to utilize facts already known, and puts us in the way of discovering new truths. Also to urge that dropsy is not a disease, but simply a physical sign, and that the physician who simply makes a diagnosis of ascites, or assigns this as a cause of death is as blamable as if he only made a diagnosis of crepitant râles or bronchial breathing and gave these as causes of death. Also to call attention to at least one new method in diagnosis. While the following definitions may seem trite, they may aid in a clearer understanding of the questions discussed. Dignosis in medicine is not simply naming a disease, it is the science and art of observing and of discriminatingly interpreting the phenomena of disease. Thus it comprehends a recognition of the phenomena, symptons or signs, a grasp of the actual conditions underlying them, the disease itself, together with an appreciation of the morbid changes which have taken place in the organism or the various organs; embraces a knowledge of the nature and intensity of the pathologic processes that have been and still are in operation, the causes which inaugurated them, and the direction in which they tend; thus estimating the patient's powers of resistance, the lethal tendencies of the disease and the patient's chances of recovery. In order to discriminatingly interpret the phenomena of ascites, according to our definition, a knowledge of its pathology is an essential prerequisite.

What is ascites? Strumpell says, page 460: "It is a collection of transuded serum in the abdominal cavity, due to venous stasis." I hope to be able to demonstrate that it is not always a trasudation, is not always serum and not invariably due to venous stasis. Under normal circumstances, a part of the fluid constituents of the blood passes through the vessel wall. Filtration predominates. The rapidity of flow of this current depends upon blood pressure, composition of the blood, and permeability of vessel walls. All dropsies are due to an increased transudation of the fluid portion of the blood from the vessels, or diminished absorption by the lymphatics and veins. The former is probably the more important factor. It is produced by the capillaries acting as filters, the rapidity of this filtration depending upon (1) pressure and composition of blood, (2) not only on the permeability of vessel walls, but also upon the fact that the endotheleal cells may act as secreting gland cells and that the chief incentives to this increased activity are those toxic substances which are produced as the result of the bacterial life, of malignant disease, or morbid metabolic products of the tissues.

The essential factors in the determination of the site of a dropsy are the increase in the permeability of the vessel wall, and the secretory activity of the cells lining the serous cavities, and therefore an ascites, except as part of a general dropsy, denotes a local cause, an inflammatory origin, as increase in the blood pressure, by adding 6 per cent. salt solution, even to 10 per cent. of the body weight, causes no dropsy of the serous cavities. (Thoma, Pathology, Vol. 1, p. 347.) In accordance with the foregoing pathology, effused fluids are classified as transudations and exudations, an exudation being regarded as a "fluid derived from the blood and formed in consequence of the local action of chemically acting substances which increase the permeability of the vessel wall" (Thoma).

Such a fluid is usually turbid, may be stained with blood, is alkaline in reaction, has a specific gravity of 1018 or higher, contains three to seven per cent. of albumen, may coagulate readily, as it contains the fibrin factors, and therefore consists of plasma rather than serum; also contains formed elements as leucocytes, blood corpuscles, epithelial cells, etc., and may undergo special changes and become purulent, putrid or caseous under the influence of infective agents. It may be chylous or chyliform, the former indicating an actual discharge of chyle into the peritoneal cavity. The latter has the properties of chyle, but the fat is less in amount (Bouliengier).

When such a fluid is formed in the abdominal cavity it denotes that in the cavity or its walls there exists a local cause, either a pathogenic organism or its product, or a tumor, as cancer, which forms abnormal metabolic products which possess the power of stimulating the cells to increased abnormal activity in which the activity is the analogue of the secreting cell, and thus includes all causes of an inflammatory character.

Transudations are clear fluids, yellowish in color, alkaline in reaction, with a specific gravity below 1018; contain very little albumen, five-tenths to nine-tenths per cent., and therefore do not coagulate readily on boiling; little or no fibrin, and therefore strictly serous, although they contain fibrino-plastin (A. Schmidt). They contain fewer formed elements than are found in exudations.

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They are not inflammatory in origin, but due to obstruction.

Another point which is of great value in distinguishing these fluids, is that proposed by Rosenbach and Pohl by the administration of iodide of potassium. This drug passes rapidly and abundantly into the transudations, but not at all into exudations, thus further indicating that the former are filtration products, and that the latter owe their presence to cellular activity. It may be detected by the addition of nitric acid and chloroform to the fluid, when the characteristic red color of the iodine may be seen in the chloroform.

The following table, modified from Thoma's Pathology, shows at a glance the specific gravity and the percentage of albumen in ascitic fluids, together with the maladies in which it is present as a physical sign:

		Average Sp. Gr.	Average per cent. of Albumen.
Transudation	Bright's disease	1006	0.56
	Congestion of portal circulation as cirrhosis, etc.	1008	0.97
	Venous engorgement, as heart disease with broken compensation, pressure on ascending vena cava, obstruction of thoracic duct	1012	1.96
Exudation	Tubercular peritonitis	1022	5.76
	Carcinoma of peritoneum or of any of the abdominal organs	1018	3.80
	Purulent exudation	1027	7.10

Having determined that there is fluid in the peritoneal cavity, that when the patient lies on the back the percussion note is flat in the flanks and tympanitic in the umbilical region, that there is a mobile line of dulness, tympany in the left flank when the patient lies on the right side, freely movable uterus if the patient be a female, continuous flatness in the right side from upper border of the liver down to the pelvis, that there is fluctuation, and that a percussion stroke upon one side may be felt by the palpating fingers upon the opposite side; by all these simple means we easily demonstrate that it is an ascites and not an ovarian cyst, unless the latter has ruptured. We have now taken but one short step toward a diagnosis. Having determined that there is an ascites we next inquire its cause, and we should always ask ourselves what may its cause be.

It may be due to—

(1) Disease of the kidneys, either acute diffuse nephritis, or chronic nephritis with exudation (Delafield, 20th Century Practice, Vol. 1, p. 23).

(2) Cirrhosis of the liver or some obstruction to the portal circulation.

(3) Organic disease of the heart with broken compensation.

(4) Obstruction of the ascending vena cava from tumor, etc.

(5) Obstruction of the thoracic duct.

(6) Tubercular peritonitis.

(7) Cancer of any of the abdominal organs, as peritoneum, stomach, liver, pancreas, ovaries, omentum, etc.

Having determined the chief causes we should proceed about as follows provided the amount of distention is sufficient to warrant tapping. Give the patient iodide of potassium for a day or two, withdraw some of the fluid and examine. A glance at the table will show that if it contains iodine and has a specific gravity below 1018 it is a transudation and we have some one or more of the first five causes to indentify.

According to Delafield, the only forms of nephritis in which there is an ascites, except as a part of a general dropsy or from secondary involvement of the heart, are acute diffuse nephritis, or chronic nephritis with exudation, the so-called exudative nephritis. Thus the recognition of the nephritis as the cause of the ascites would thus limit the diagnosis to one or other of these two forms of the disease. In both of these, ascites may be marked, but general dropsy is usually present.

Acute diffuse nephritis is accompanied by dropsy of the serous cavities preceded by anasarca, first manifesting itself in the face. It may follow scarlet fever, diphtheria and pregnancy. The patient may be in bed and very ill, or he may seem to be in fair health. In the former case, the rise of temperature, cerebral symptoms, tense arteries, accentuated aortic second sound, exaggerated heart's action, and later evidences of hypertrophy, dyspnœa, nausea, vomiting, scanty high colored urine with abundance of albumen and casts all contribute to make a clinical picture so plain, that a mistaken diagnosis would seem impossible. The ascites which is sometimes present is a mere incident. In more chronic cases, there is no fever, slight headache, less disturbances of digestion, anæmia, anasarca, a peculiarly pearly appearance of the face, tendency to recurring nasal hemorrhage without ulceration of the septum; vision may be impaired, sexual vigor impaired or lost, all symptons worse in the winter and better in the summer, urine diminished, contains no blood but contains albumen and casts. Later in the disease the serous cavities become more involved, and there may be double pleural effusion as well as ascites; general œdema is present no matter how much urine is passed, and the patient soon dies.

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Chronic diffuse nephritis. This is one of the most insidious of diseases, and one of the earliest manifestations may be recurring nose bleed or persistent headache; or a pneumonia occurs and death takes place before the disease has been recognized. The dropsy may be prominent if there is much albumen in the urine. On the other hand, with little albumen in the urine, there is likely to be less dropsy. The urine varies in quantity from less than normal to twice the normal amount, its specific gravity from 1001 to 1020, the total urea gradually diminishes and it regularly contains albumen and casts. The dropsy, the anemia, hypertrophied heart, high blood tension, dyspnœa, uræmia, bronchitis, digestive disturbances, continuous headache and retinitis should make a diagnosis easy and certain. One point might be emphasized. The occurrence of albumen and casts in the urine is not proof of the existence of Bright's disease unless organic disease of the heart with broken compensation can be excluded.

Cirrhosis of the liver. While obstruction of the portal circulation from any cause may give rise to an ascites, it is in cirrhosis that it is most marked and frequent. The history of the case is often a history of alcoholism, disease of the heart, syphilis, gout or tuberculosis, more common in the male, and is a disease of adult life, except in rare cases of congenital infantile syphilis. Inspection reveals a patient whose nutrition is greatly impaired, the color of the skin a mixture of anæmia and jaundice, there may be venous stigmata upon the cheeks, the jaundice varying in intensity, the deeper the tint the graver its import, and when associated with dropsy almost always limiting the diagnosis to either cirrhosis or cancer, remembering that jaundice may be absent in the latter. The veins of the abdomen are distended, especially over the liver. The dropsy invariably begins as a belly dropsy, and is the only one of the transudations which appears first in the abdominal cavity. Later in the disease there may be general anasarca. Occasionally cirrhosis occurs without dropsy, but this would not come within the limits of this paper.

At the time when ascites is marked, the liver is invariably diminished in size, and this may often be demonstrated by auscultatory percussion before aspiration of the fluid. The spleen is often, though not always, enlarged. Gastric derangements are constant, and there may be hemorrhage from the gums and nose, and hæmatemesis is common, the blood coming from the varicose veins at the lower end of the œsophagus. Hæmorrhoids are present. The temperature may be above normal and chills may occur. The urine is scanty, high colored, contains bile, usually amounts of sugar, and the urea is below normal. We may have cerebral symptoms of a toxic character, mild delirium, and occasionally coma and convulsions.

Organic disease of the heart, with broken compensation, would naturally lead to little confusion or difficulty in diagnosis, except in those cases in which there is cardiac dilatation with broken compensation, both secondary to a chronic nephritis. The diseases of the heart in which ascites occurs most frequently are those at the mitral orifice, and those of dilatation and consequent regurgitation through the tricuspid orifice where this condition follows disease of the left heart as consequence upon cause. The evidences of broken compensation, such as cyanosis, dyspnœa of effort, inability to lie down, venous engorgement everywhere, giving rise to cough, bloody expectoration, digestive disturbances even to hæmatemesis, diarrhœa, diminished urine containing albumen and casts, the general anasarca beginning in the ankles and later in the abdomen, the anæmia, together with a history of rheumatism, furnish a picture which should make the diagnosis easy.

Pressure upon the ascending vena cava invariably causes great distension of the veins of the lower extremity as one of its earliest manifestations. This characteristic alone ought to easily distinguish it. In addition, a palpable tumor might be present.

Obstruction of the thoracic duct cannot be determined until the fluid is withdrawn. Then, as already pointed out, we should distinguish between chyliform and true chylous ascites.

Here it is necessary to consider the wide quantitative divergencies between different specimens of chyle. Thus the fat may vary from .92 per cent. to 2.7 per cent. (Halliburton, Text-Book of Chemical Physiology, p. 336). Then we must not forget the possibility of admixture with other effused fluids and chyliform ascites where the fats are formed by the degeneration of the cellular elements.

The history, absence of other causes, the use of the following table as a guide, together with experiments in feeding, and with the detection of sugar in small amounts, ought to make the diagnosis at least reasonably certain:

	Average per cent. of Albumen.	Average per cent. of Fat.
Chyle	4.1	1.8
Chylous ascites	3.18	1.35
Chyliform ascites	.76	.72

Ruptured ovarian cyst. A question in diagnosis is here presented which is not always unattended with difficulty. If the history is clear, we learn originally there was a tumor which began low down in the pelvis upon one side, gradually increased in size until the whole abdomen was filled by the tumor which, if examined by a competent observer, showed upon inspection that the abdomen projects in front when the patient is lying on the back, instead of bulging at the side as in dropsy; that when the patient was lying on the back there was tympany in the flanks, usually a line of tympany between the liver and the tumor, flatness in the umbilical region, absence of fluctuation beyond the

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outline of percussion flatness, absence of fluctuation when the walls are very tense or extremely thick or the quantity of the fluid small. Palpation reveals the pulsations of the abdominal aorta conducted to the surface of the abdomen. Vaginal examination discloses a uterus usually displaced behind the cyst, and not freely movable as in ascites; pushing upward upon the lower part of the abdomen may be felt to cause traction upon the uterus, and there is no fluctuation as in ascites.

If all the foregoing signs become changed to those of ascites, of fluid free in the peritoneal cavity, then the diagnosis is easy. If, however, the case comes to us with no such history and with the physical signs of an ascites, the difficulty in diagnosis is great and may be impossible without opening the abdomen. Then an examination of the fluid is the only means of making a diagnosis. "And this is not easy; at times, indeed, it is impossible" (Von Jaksch).

While the fluid of an ovarian cyst is generally to be distinguished by its high specific gravity, 1020 to 1026, its alkaline reaction and slight tendency to coagulation, nevertheless it is extremely variable in its characters, and may be very low in specific gravity. The latter usually indicates a cyst of the broad ligament (Westphalen). The fluid contains an abundance of débris, the only diagnostic element being the "granular cell" of Drysdale and W. L. Atlee.* Spencer Wells accepts the presence of this cell as characteristic of ovarian fluid.

Suppose, however, that instead of finding that the fluid is an effusion, we find no iodine, and that the specifie gravity is 1018 or higher. Let us suppose that we have eliminated ruptured ovarian cyst, and we readily see that we have left only two possible causes, namely, cancer of some of the abdominal organs, or tubercular peritonitis. Between the former with its absolutely hopeless fatal prognosis and the encouraging, almost wonderful results of surgical interference or of Vaughan's nuclein treatment in the latter, the patient awaits with the keenest, intensest interest the verdict of the physician. Is he to be condemned to inevitable death by slow torture, or is he to be at least granted a reprieve, given a new trial, given renewed hope? How often is the physician compelled to frankly reply that on account of conflicting history and confusing physical signs he cannot answer the question, cannot decide the case, that "time alone can determine."

One of the aims of this paper is to call attention to a method which will enable us to answer this question positively, dogmatically, and which is easy of application, accurate in its results, and absolutely safe. I refer to the use of Koch's tuberculin. While the use of this substance has long been recognized as an infallible test of the existence of bovine tuberculosis, it has not, so far as I am aware, been used to any extent in the diagnosis of this condition in man. I have used it in pulmonary tuberculosis, tubercular adenitis where an erroneous diagnosis of Hodgkin's disease has been made, several causes of tubercular peritonitis, tubercular pleurisy, tubercular pyelitis with tubercle bacilli in the urine, tubercular vesiculities with the bacilli in the seminal fluid, tubercular ulceration of the mouth, pharynx and larynx, where there was some difference of opinion as to whether the case was syphilis, cancer or tuberculosis. In all cases the characteristic rise of temperature of two to four degrees F. occurred within from four and one-half to six or eight hours.

In several cases of adenitis, etc., which were supposed to be tuberculosis, no reaction took place, and in those in which there was a fever of nontubercular origin, the temperature fell instead of rising. I mix one drop of the tuberculin with twenty drops of a one per cent. solution of carbolic acid and then inject from ten to fifteen drops of this mixture, thus administering from half to three-fourths of a drop of the tuberculin. Only one dose is given. It goes without saying that a careful temperature curve should be made for the two or three days preceding the injection, then for that twenty-four hours, and also for a day or two following. This method is, as I have repeatedly demonstrated, of special value in those cases in which the amounts of fluid are small, or where for various reasons tapping is objected to. Suppose now that we have obtained the characteristic fluid containing no iodine after the administration of the potash, that it is 1018 or higher in specific gravity, contains an abundance of formed elements, coagulates readily, and that the patient reacts to tuberculin. We are in a position to state most positively that the case is one of tubercular peritonitis. The concurrent signs would be the following:

One of the strongest points is the coincident occurrence of tuberculosis elsewhere, coincident pleural and abdominal effusions when the former is unilateral, are almost always tubercular. Such patients have abdominal pain, nausea, vomiting and diarrhœa; the abdomen may be so emaciated as to show the intestinal convulsions, palpation reveals tenderness, the abdomen may be tumefied, greatly distended; there is rapid emaciation, sweats, temperature, cachexia. The disease may be acute and run its course rapidly or be chronic or of long duration.

Cancer of the peritoneum. Without the use of the tuberculin test, this disease cannot be always distinguished from tubercular disease, on account

*This cell is described as round or oval, nonnucleated, varying from the one five-thousandth to one two-thousandth of an inch in diameter, transparent and smaller than the compound granular cell of inflammation, and contains a number of granules which become more distinct upon addition of acetic acid. Transactions of British Medical Association, 1873 (*British Medical Journal*, June, 1878).

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of the similarity of the phenomena. It is fortunately less common, occurs in older patients, is often secondary; there is no fever, sweats, or diarrhœa; more pain, enlarged lymphatics, palpable tumor of the omentum. Cancer of the retroperitoneal glands, as well as of other organs of the abdomen, may cause much difficulty in diagnosis in the absence of palpable tumor. If the fluid be an exudation, and we have excluded ruptured ovarian cyst, and also tubercular peritonitis by means of the tuberculin test, this would render the diagnosis of cancer almost certain.

THE PROTOZOA IN HUMAN DISEASE.

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The whole realm of living things is divided into two great subdivisions, the animal kingdom and the vegetable kingdom. Viewed from the standpoint of their highest developed forms, these two subdivisions seem widely separated and possess few characteristics in common. But when, beginning with these forms, we trace back step by step the process of their evolution, passing from the highly specialized to the simple, and from the simple to the unicellular, we finally reach a life stage where the organisms of the animal kingdom resemble most closely in structure those vegetable in origin.

Indeed, so difficult has become the task of establishing a boundary line between the plant and the animal in this intermediate field of unicellular life, that it has become a veritable battle ground over which botany and zoölogy are contending for the right of possession.

In the light of our present day knowledge those unicellular organisms which belong to a phylogenetic series, leading by direct succession to plants, are vegetable in origin and classed as bacteria, while the unicellular organisms, not exhibiting such a relationship and possessing the power of locomotion, are classed as animals under the name protozoa.

The investigation relative to the etiology of disease might have been carried on with equal vigor in both these realms of life had not the brilliant discoveries of Koch and Pasteur turned the tide of research toward the vegetable organisms as the most probable source of disease. With tuberculosis, cholera and anthrax demonstrated as specific microbic diseases, the research forces of the profession and those branches of science akin to medicine, threw themselves into the study of these vegetable cells. Immense laboratories were constructed and equipped. Thousands of scientific and medical men flocked to the great laboratory centres to learn of these new organisms. And the patient, toiling laboratory worker became the famous investigator if he could but isolate one of these minute bodies and demonstrate its constant presence in some hitherto obscure pathological condition.

The interest thus created in bacteria has become so intense that the medical profession is loth to accept any other agency as a causal factor in disease, and pays but little attention to investigation along other lines looking toward this end.

Granting that bacteriology is growing to a science in our midst, that it has revolutionized many of our ideas of disease, that it has established a specific cause for a number of hitherto obscure pathological conditions, still we have not reached the goal of a complete pathology. What of smallpox, scarlet fever, measles, rheumatism, cancer, yellow fever, whooping cough, Hodgkin's disease, influenza, and many other diseases as to the cause of which bacteriology is almost if not quite silent. Nor is the proof which bacteriology offers concerning the microbic cause of some diseases which the profession considers as settled as positive as it might be. Apply the rules of Koch to the generally accepted germ cause of pneumonia, gonorrhœa and typhoid fever. Is their etiology established beyond question? We are not in a position where we can ignore the results reached in any avenue of systematic research seeking to throw any light upon what is manifestly a very intricate problem.

It is with the hope of arousing the interest of the profession in general in the investigation of the animal kingdom relative to disease etiology, as well as to detail the results already secured in this field of investigation that this paper has been written.

Protozoa are organisms of microscopical size and simple structure. They possess a body devoid of organs and discharge their vital functions as one mass of protoplasm. They are one-celled animals. Possessing no muscle, yet capable of motion; no nerves, yet sensitive to stimuli; no alimentary canal, yet capable of digesting and assimilating food; no sexual organs, yet they produce their kind. To form a more complete idea of these simple organisms, take the amœba as an example.

The entire body of this protozoan is composed of a naked mass of protoplasm, an outer clear portion the ectosarc, an inner granular portion the endosarc. This protoplasm is not confined in any cell wall, but is free to float about as the organism wills. Situated near the centre of this protoplasmic mass is a spherical body, the nucleus, while scattered about in the protoplasm are numerous

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vacuoles, fat globules, and bodies of the nature of food. When the amœba is in a resting state it appears as a round, shining globular mass. If, however, the animal is active, the protoplasm is constantly changing its shape. One moment it is round, the next oblong; a little later perhaps oval or star-shaped, and you will see flowing out from the main mass and then retracting into it narrow, shining arms, called psuedopodia. It is the flow of the protoplasm which gives the organism the power of motion. All at once a pseudopodium creeps out from the main mass. Little by little it enlarges until it equals in size the body proper. Then suddenly, as if swept by some powerful undercurrent, the nucleus, vacuoles, and remaining protoplasm are carried over into what but a moment before was only an arm of the main body, and the amœba has changed its position. If a diatom is met with and the amœba desires food, it thrusts out these little arms around the diatom, crowds it into the centre of the organism, where it is digested, and the amœba flows away leaving the débris behind. There is no mouth, no stomach, no cloaca. This selfsame protoplasm is each, and all in its functions. Its reproduction is by division, first of the nucleus, later of the protoplasm, until finally two organisms appear in the place of the parent cell.

As the term protozoa includes a large number of organisms aside from the amœba, there are many modifications from its simple type. For example, the radiolaria, instead of being naked, are covered by a calcareous shell pierced by holes through which the pseudopodia are thrust. The infusoria possess a permanent apparatus to move about with in the form of cilia, while the gregarines move in a worm like fashion by the contractions of their bodies. The amœba, as we stated, takes in food at any portion of its body, while the infusoria takes solid food through an opening at one end, and the gregarines, which live only as parasites, receive their nourishment from their host by absorption.

In methods of reproduction the protozoa differ markedly. The amœba multiply by direct division, while the sporozoa reproduce by the formation of hard-shelled spores, which in turn develop sickle-shaped bodies, and these, creeping out from the spores, form new parasites. On the other hand, in some of the infusoria, for example, balantidium coli, a process of conjugation, precedes the reproduction by division.

We see, then, that in protozoa we are dealing with a class of organisms the simplest in the scale of animal life. Their minute size makes it easy for them to gain entrance to the host through the air breathed, or the food and drink taken, or to be transmitted from one animal to another. Their power of independent motion enables them to infect organs and tissues not reached by nonmotile organisms. Their presence in large numbers in water, soil, and parasitic in the lower animals used as food, furnishes a rich source of infection. While their simple structure, methods of securing food and process of rapid reproduction fits them for a parasitic life. What, then, stands in the way of these organisms becoming etiological factors in the production of disease? Nothing but the demonstration of their presence in and their causal relation to such abnormal conditions. If we are inclined to ignore these theoretical reasons, let us pass to a consideration of the facts which investigation has accumulated, demonstrating the causal relation of protozoa and certain diseases.

One of the maladies best known to man, in its clinical manifestations, is malarial fever. An infectious disease, exhibiting intermittent and remittent attacks of fever, chills and sweats, with subsequent cachexia. Klebs[2] and Tomasi-Crudeli,[3] in 1879, by announcing the discovery of the bacillus malariæ, endeavored to place this disease in the list of germ infections. But the honor of establishing its true etiology belongs to Lavaran, who, in 1880, published his "Traite des fievres palustres," showing that, in persons suffering with malaria, peculiar amœboid bodies infected the red blood corpuscles, causing their disintegration and death. Later, Marchiafava, Celli, Golgi, Councilman, Osler, Dock and others verified his observations, added new facts and accumulated additional evidence, until today the protozoan origin of malarial fever stands unquestioned. Subsequent to a paroxysm these organisms first exhibit themselves as small, round, colorless bodies situated within the red corpuscles. A little later and they have increased in size, and contain a few dark pigment granules. Seen still later, the bodies have grown still larger, the pigment granules more numerous. On the day of the paroxysm they have so increased in size as to entirely fill the corpuscle, and the pigment granules are seen in masses. Then, as the attack comes on, each oval body divides into fifteen or twenty smaller bodies, which arrange themselves in a group with the pigment granules in the centre. Finally, as the paroxysm disappears, the oval bodies reappear, invading the red corpuscles as before. Sometimes forms with one or two long processes attached are seen outside the corpuscles in the circulating blood. In quartan fever, for the forms just described are those of the tertian type, the organisms are smaller, and in the segmentation only six to ten bodies are formed, while in the æstævo-autumnal fevers a form the shape of a crescent has been described. At first many observers maintained that these bodies were degenerated blood corpuscles or the artifacs of technique. But the fact that they contain a nucleus and nucleoli, reproduce by spore formation and possess the power of amœboid movements, has induced the best authorities to class them as living animal organisms and as protozoa.

The discovery of these bodies and their classi-

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fication as animals marks a new era in the study of disease etiology. The medical world had already learned the great truth that a vegetable organism (bacteria) might be the specific cause of an infectious disease. Now it is forced to believe that an organism of animal nature can stand in a like relation, and be the sole etiological factor in reproducing a train of well known clinical symptoms.

But the presence of these organisms in the red blood corpuscles of man is not the only instance in the animal kingdom of an intracorpuscular invasion by protozoa. Organisms with round and worm-like bodies, possessing amœboid movements, have been described by Krause,[31] Celli[29] and Sanfelice,[29] Pfeiffer[30] and others in the red corpuscles of the frog. Numerous instances of the infection of red corpuscles of birds by protozoa have been described by Pfeiffer,[30] Grassi,[28] Feletti,[28] Celli[29] and Sanfelice[29] and others. Some of the forms exhibit amœboid movements, some possess flagellæ, while others show a process of multiplication by spores. In the blood of fishes, turtles and more rarely dogs, horses, mice and other animals, similar intracorpuscular parasites have been observed. Among the lower animals no special pathological importance has been attributed to these organisms except in the instance of Texas fever in cattle. This is an infectious disease characterized by high fever, jaundice, bloody urine and anæmia, which attacks the cattle of the western and southern states. Dr. Th. Smith[1] describes, in the red blood corpuscles of the infected animals, organisms similar to the protozoa of malaria. He maintains that these bodies are not present in the blood of cattle under other conditions, and that they are the cause of the disease, the resulting anæmia and the final death of the animal.

But protozoa do not limit their parasitic ravages to the blood. We have conclusive evidence of their etiological relation to certain inflammatory conditions of the intestinal tract.

Tropical dysentery, a disease prevalent in southern countries, and characterized by frequent stools, pain, tenesmus, anæmia, and anatomically by ulceration of the large bowel, is caused by a protozoan parasite, amœba coli. The organism is from five to eight times the diameter of a red blood corpuscle, has a granular protoplasm and a vesicular nucleus. It possesses the power of amœboid movements, and is found in large numbers in the stools, on the floors of the ulcers and in the liver abscesses.

This protozoan was first described by Lambl[5] and later by Lösch,[4] who clearly demonstrated its relation to the dysenteric symptoms. Since then the observations of Kartulus, Baelz, Sonsino, Cunningham, Dock, and, more recently, Councilman[6] and Lafleur[6] have added enough evidence to prove beyond question the etiological relation of this protozoan and tropical dysentery.

The facts which go to prove this are as follows: First, the presence of the amœbæ in large numbers in the lesions of the disease. Not only are they found in the stools, the floors of the ulcers and in the liver abscesses, but they crowd the lymphatics, infect the tissues around the ulcers, and are seen even in the blood vessels of the large intestines. Second, their cultivation in artificial media outside the body. Kartulis[17] was able to grow them in straw infusion. Third, their inoculation into animals with the production of similar diarrhœac symptoms. The experiments of Loos[7] with cats proves this. Here, then, is a disease involving the intestinal tract, with clearly defined clinical symptoms whose cause is an animal organism.

Turning from amœba coli we find evidence that other protozoa can produce inflammatory lesions of the intestinal tract. Malmsten[10] first described in the stools of a man with diarrhœa, and later in a woman suffering from intestinal flux, an animal organism with a short, oval body, an anterior funnel-shaped extremity narrowing into a cleft covered with cilia, a nucleus, and two contractile vesicles which he named Balantidium Coli. Later, Leukart[20] described the same organism infecting the intestines of the hog, from which he believed the human infection originated.

Of the early investigators Steida,[16] Ekeckrantz,[13] Belfrage,[18] Wising,[19] and of the later, Ortmann,[2] Pfeiffer[30] and Mitter,[22] all report cases of chronic intestinal catarrh in which this organism was present.

That balantidium coli stands in some relation to this intestinal inflammation is certain, since, when the disease is at its height the orgrnisms are most numerous, while, when they are few in number, the inflammation is quiescent or disappears.

A good deal of evidence has been accumulated to show that an intestinal inflammation can be caused by cercomonas intestinalis, a protozoan of the class infusoria, with a pear-shaped body armed at one end with a long delicate vibrating flagellum, and at the other by a sharp beaklike process by which it attaches itself to foreign bodies. Lambl,[11] Ekeckrantz,[13] Tham,[14] Zunker,[15] Davaine[12] and others describe cases of individuals suffering for years with dyspepsia and diarrhœa, and passing yellow, putrid smelling stools in which this animal organism was present in large numbers. That these parasites had to do with the disease and were not accidentally present is probable, in that recovery took place on the disappearance of the parasites, and an aggravation of symptoms at their increase. Another protozoan which infects the intestinal canal of man is coccidia, animal organisms with egg-shaped bodies covered with thick, smooth shells with an opening at one end, which reproduce by spore formation, forming four curved hyaline bodies. They are found in greatest numbers within the epithelial cells of the intestinal tract, causing their destruction as well as inflam-

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mation and ulceration of the surrounding tissues. They appear in the fæces as ovoid bodies, .022 of a mm. in length, with a thin membrane enclosing groups of granular nuclei. Dyspepsia, colic and diarrhœa are the clinical manifestations of the disease. Kjellberg[23] and Virchow,[23] Eimer,[24] and later Podywssozki[25] and Railleit,[26] all describe such an infection.

Other protozoa, such as megastoma intestinalis and trichomonas intestinalis, have been observed in fæcal discharges, but as yet have manifested no pathological significance. Besides these protozoa, parasitic in the intestinal canal of man, we have numerous instances of similar invasion among the lower animals. I instance the gregarines in the intestinal canal of insects, lobsters and the earth worm, the psorospermiæ invading the intestinal epithelium of fowls, as well as the coccidial infection of the epithelia of the intestinal tract of cats, dogs, mice, rabbits and other animals.

From these observations it seems certain that the protozoa are prominent etiological factors in a large number of intestinal troubles. In some cases, as that of balantidium coli and cercomonas these organisms may cause inflammation by mechanical irritation. In others, as that of amœba coli, we have a direct infection of the intestinal mucosa, the lymphatics and blood vessels, causing death of tissue and ulceration. While in coccidia we have an organism which penetrates into the columnar cells of the mucous membrane of the bowel, and by its presence or its toxic products causes wide-spread cellular destruction.

Of the various organs of the human body the *liver* is the one most subject to protozoan infection. Abscess of this organ is a common complication in tropical dysentery, caused, no doubt, by the amœbæ being carried to the liver in the blood stream, there producing necrotic and suppurative changes. The abscesses may be single or multiple, and contain large or small numbers of the parasites. Many cases of abscess of the liver, not complicating tropical dysentery and due to the amœbæ coli, have been reported. Masse[33] and Eichenberg[34] have placed such cases on record. Another protozoan which infects the liver of man is the coccidium oviforme. Leuckart[20] first observed and described this organism as present in the small, hard, white nodules found in the liver of certain rabbits. The animals become thin, lose their appetite, develop rapid, violent breathing, and die in convulsions. This organism resembles closely in appearance and structure the coccidia before described as infecting the intestinal epithelia of man and the lower animals. They are present most abundantly in the epithelial cells of the bile ducts, causing diminution of the bile secretion, obstruction to its flow, and destruction of the neighboring liver cells. A number of cases have been observed in man. Gubler[41] described the case of a stone breaker, forty-five years of age, who complained of dull pain in the right hypochondrium, and dyspepsia. The physical examination revealed an enlarged liver with a projecting tumor near the gall bladder. The diagnosis was echinoccus. At post mortem the enlarged liver showed twenty or more cancerous looking tumors the size of a chestnut, the interiors of which were filled with a creamy fluid. On microscopical examination this fluid revealed large numbers of egg-shaped bodies, which Leuckart identified as the animal organisms, coccidia. Other organs beside the liver suffer from protozoan infection. Lindemann[27] found coccidia in the kidneys of two patients dying of supposed Bright's disease. Abscess of the lung has been traced in a number of cases to an infection by amœbæ coli. Rosenberg[35] reports the case of a serous cyst in the heart which contained great numbers of sarcosporidia. Among the lower animals Balbiani,[37] Pfeiffer,[30] Raillet,[38] Thelohan,[39] Miescher[40] and others described great mass infections of muscle tissue by small spore forming animal organisms. Thus we have described the infection of the muscle cells of mice and hogs by sarcosporidia, that of certain fishes by myxosporidia, that of frogs and tortoises by microsporidia.

Likewise, in the muscles of hogs, sheep, horses and other animals, there is found an animal organism shaped like an elongated tube and covered with a thick skin, the so-called "Rainey's tube." The contents of this parasite is composed of a large number of kidney-shaped bodies, which are developing spores. What pathological importance may be attached to the presence of these parasites in the lower animals has not been determined. Indeed, among bacteria and protozoa alike, there exists a large number of harmless parasites, species who live in the bodies of other animals without causing any marked deleterious effects.

The protozoa also stand in a causal relation to some skin diseases. In 1890 Darier,[8] in his study of keratosis follicularis, observed and described certain small shining bodies in its skin lesions, which he believed to be coccidia and the cause of the disease. Osler,[36] speaking of these parasites, says: "No one, accustomed to the appearance of the psorosperms as seen in the lower animals, could question the parasitic nature of these bodies." Likewise Wickham, in a monograph, Paris, 1890, described similar bodies in Paget's disease of the nipple which, he maintained, were the cause of the disease.

In the vessels of herpes zoster, Pfeiffer[30] describes within the epithelial cells large shining egg-shaped bodies with a nucleus and scanty protoplasm which he believes are animal parasites. In the epithelial cells of molluscum contagiosum and certain carcinomata, small, round, shining bodies (coccidia ?) with hyaline borders, possessing amœboid movements, and reproducing by the formation of spores, have been described by many observers and classed as animal parasites. Other investigators look upon these bodies as metamor-

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phosed cells, changed blood corpuscles, degenerated nuclei, or the artifacs of technique. But the long list of reliable observers, such as Foa, Podwyssozki, Sawtschenko, Steinhaus, Albarran, Wickham, Darier, Pfeiffer and others, who have described and pictured these structures as bodies distinct from cell elements, forces us to accept their presence and nature as established. Whether they are the causal agents in the production of cancer future investigations must decide. Efforts to cultivate these organisms have been fruitless, and the experiments seeking to establish the infectious nature of cancer itself, have been only in part successful.

Until both these questions have been settled, there is but slight foundation for the claims of coccidia as the cause of this malignant disease.

The presence of animal organisms in certain skin diseases has led to the study of small pox, scarlet fever and measles from this point of view. Of the two latter infections nothing of importance has been observed. However, Guarnieri, at the Eleventh International Medical Congress, in 1894, described under the name "cytorictis vacciniæ" an organism with amœboid movements, which he found in the forming pustules of variola and to which he attributes this disease. Monti[9] describes similar bodies in the pustules of variola, and found the same structures in the cornea of rabbits after inoculation from the pustules. Ruffer[32] and Plimmer[32] and Pfeiffer[30] describe like bodies, not only in the pustules of variola, but in those of vaccinia and varicella. The evidence thus far accumulated showing the protozoan origin of small pox is only suggestive. Without more extended observation, reliable inoculation experiments, and a complete identification and life history of the organism, no good reason exists for attributing the cause of this infection to an animal parasite.

From this brief consideration it must seem evident that these animal organisms play no small part as etiological factors in disease.

Notwithstanding the small number of investigators and the necessarily unsystematic methods used, enough evidence has been accumulated to demand a thorough study of the protozoa, seeking to establish their relation to all pathological conditions for which no specific cause has been determined. When diseases like tropical dysentery, malarial fever, abscess of the liver, a long list of catarrh conditions of the bowels have been demonstrated as due to protozoa, when daily evidence is increasing, demonstrating the presence of these parasites in Paget's disease of the nipple, cancer, herpes zoster and variola, it is high time that the general practitioner interest himself in these organisms and the investigation going on in this realm of scientific medicine.

The evidence thus far accumulated as to the pathogenic character of protozoa, their universal presence in nature, their widespread parasitic life among the lower animals, their small size affording an opportunity of easy transmission from one individual to another, their power of rapid multiplication, and their simple life processes,—all these facts point to these animal organisms as a most probable source of many infectious diseases, the cause of which bacteriology has left unanswered.

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A REASONABLE PHILOSOPHY FOR IMMUNISM IN CERTAIN CONTAGIOUS DISEASES.

By J. T. Moore, M. D.

Minneapolis.

Spencer tells us "the earth and the fullness thereof," nay, the universe with its suns and planetary systems, are the result of growth and progress, evolution. We cannot deny that they are less the result of a regular process of development than the tree that is brought more closely within our range of vision and with whose habits and changes we are all so conversant; enough however for our purpose to consider those conditions and results which fall directly under our contemplation in the immediate surroundings on this globe. Look when we will, look where we will, we constantly behold changes. The more we investigate these changes the more fully we are convinced that they are all governed by regular laws and not at all the subject of chance. In the organic world the animal throws off carbon to feed the vegetable, and the vegetable throws off oxygen to feed the animal. Heredity and environment play the greatest rôle in this evolution. A familiar illustration of the results of environment is found in any of our flowering or fruit bearing shrubery or trees. A rose, beautiful and fragrant even when wild, may be changed by cultivation, change of climate and change of soil, so that in a few years you would not recognize in it the ancestral wild rose from which it sprung. The apple, transplanted from the cold north into the milder climate of California, soon loses its specific attribute, or probably I might better say its more general attributes, due of course to changed environment. Truly heredity and environment are closely interwoven with each other, the latter strongly changing conditions for future heredity. Children of the same family separate and become influenced by totally different environments, how their families will constantly grow apart, feeling nothing akin or in sympathy with one another, they grow and absorb from their surroundings until they are as of different families. I have but spoken of these changes in the organic world, plant or animal, because we are all so familiar with them coming under our eye every day. They furnish the best illustration for what we are about to speak and which is governed by the same natural laws. With the plant certain postulates must be granted for its very life and existence, viz: sunlight, heat, moisture and soil. The same holds good for the animal kingdom.

In the microscopical world of microbes we have to deal with vegetable organisms, organisms unknown until recently and yet possessing many if not all the attributes of those in the vegetable world with which we are more familiar. It is with something of more than passing interest we trace the analogy (botanically) between the vegetable kingdom in its widest sense and the vegetable microörganisms of which we shall speak.

Starting with the class vegetable microörganisms or bacteria, we find the orders or families cocci, and baccilli. Under these again we find genera, spirila, spirochetae, streptococci, diplococci, etc., respectively. Below these again a universal law of species, like begetting like, subject of course to variations produced by environment and possibly influenced (if Darwin's theory be correct) by interfertility and intersterility, the latter being the most pronounced. Again we find some organisms multiplying endogenously and others exogenously. We might proceed to trace out the lines of relationship as it presents itself between this visible and microscopic vegetable world, and the further we proceed the more are we impressed with a universal law governing their growth, multiplication and subjectiveness to environment. Changes in forms of microörganisms have been found to occur subject no doubt to influences of environment in the same way as the generally recognized organic world. We must admit that as wide differences exist in the tissues and secretions of different persons as we find to exist in the soils of different fields. We know non-rotation of a crop will ultimately exhaust certain essentials for its growth in a soil, but the soil will bear other vegetables luxuriously. The wheat or whatever it may be has exhausted that which it requires. We know also that when certain bacteria have implanted their influence upon the soil they required to grow upon, they exhausted some specific requirement and furthermore in many instances it is not reproduced. In others where the qualification is not so specific, but more general it may be reproduced, as witness typhoid fever where the glands may not all be affected, cholera, etc. There is another class, fungi, which we have not traced through their progeny, having sufficient data in the bacteria to illustrate our point, but similiar conclusions can be arrived at from a study of their characteristics. We shall find on investigation that many similiar characteristics govern the whole organic life whether microscopic or not. Says Robert C. Eckles, M. D., in his work on the evolution of the mind, tracing it down to the lowest forms of creation, even the infusoria guide themselves in hunting for food with aparently as much precision as fishes. They carefully examine and take only of that which to them is nutritious, passing by that which is not, thus showing that the physic life of even monocellular microörganisms is exceedingly com-

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the introduction of antitoxic agents. We are told that these agents act in two ways. First, the power to neutralize the toxic element or product of the germ; secondly, by increasing the leucocytes in the blood, producing a temporary leucocytosis and thus carrying increased tissue building material to withstand the ravages of the diseased condition, the phagocytic action seeming to enjoy a secondary place in the *vis medicatrix*. These arguments we shall not assume to refute without more positive proofs than we possess against them. They do not however cover the whole ground. We have seen before that certain cellular elements have the power of selection of that portion of the neuclein contained in the leucocytes which it converts into protoneuclein fitted for its sustenance and the rebuilding of its own peculiar structure, passing by that which is adapted for other structures. From this standpoint we may argue that certain pabulums are formed by processes of selection on which various specific microbes may feed and multiply, producing in the system their own specific symptoms, until their pabulum is destroyed, eaten up and possibly also affected by the ptomaines produced in the process. The latter would seem to play quite a part in the process, judging from the recognised result of the action af antitoxines. The microbe dies for want of its proper environment, just as the rose withers and fades when removed from the soil upon which it feeds.

That some of these pabulums are more limited in production and reproduction than others, we have no doubt. Scarlet fever and small pox attack the system generally but once; if by chance the second time, on account of the pabulum being not entirely destroyed with the first attack, they are milder; or the function whereby the pabulum is reproduced may not have been entirely destroyed.

The question will here be asked, why did the disease cease while any pabulum was left? There are other forces working for nature to assume her sway: the increased leucocytosis carrying increased regenerating material, as well as by phagocytosis, has enabled the system to overcome the now weakened action of the remaining microorganisms, and hence they were overcome before the pabulum was fully destroyed. This, however, occurs but rarely. We have, however, other forms of bacteria which may infest and infect the system numerous times, illustrated in diphtheria, typhoid fever, etc. Here the pabulum is not so limited or specific in its production, and hence is subject to power of regeneration, or all parts of the system amenable to their action are not affected, so that when the system is exposed to contact with their germs again they find a proper environment to work out their characteristic mission.

Returning, however, to those cases whose only power of action is once exhibited: Laying aside the theory of destroyed pabulum and ollowed by no power of reproduction, how shall we account for future immunism. When it was found that the cow pox passed through the human system, destroyed the pabulum upon which the microbe of small pox fed, and that it produced trivial symptoms compared with small pox, what a world was opened for investigation. Darwin's law, before referred to, on interfertility and intersterility, while not exactly germain to our text, serves as an apt illustration of certain laws which; if properly interpreted lead us to see the unity of nature's handiwork, interfertility occupying much narrower limits than intersterility. Reasoning from analogy we find in these microscopic organisms, certain bacteria must reach and inoculate certain pabulum before it can germinate life and produce propagation of its species to produce similar disease. True, in case of vaccination, we do find a modification, and this is within the same species, only a modification of it, and it is this law which we believe will yet be traced to practically modify all diseases belonging to organisms of the same species. Who will be the fortunate one to discover or propagate a virus which shall render immunism to the contagion of scarlet fever? If no animal can be found to render the same service as the cow in small pox, then by a double inoculation of some culture medium, with two or more forms of bacteria within the same species, by the process of interfertility or intersterility produce a virus which will rob this disease of its terror.

We will sum up the points I wish to make under four headings, viz:

I. A special pabulum, differing in quality, organized in different parts of the body, each forming a specific culture medium for each species of bacteria.

II. That the destruction of this pabulum means death of the microbe and natural termination of the disease.

III. A change wrought in the vital principle of the gland or part preventing reproduction and future immunism.

IV. The destruction of the pabulum and prevention of reproduction by an antitoxic treatment in all cases, where the microbes feed only upon such pabulum, and not upon the tissues of the body as well, as, for instance, the tubercle bacillus.

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SPECIFIC MEDICATION IN TUBERCULOSIS OF MAN AND BEAST.

By Paul Paquin, M. D.

St. Louis, Mo.

Specific medication in specific maladies is now recognized as the objective point of medical research. Whatever the means employed, the course of events and the processes to that end, the object sought is the all important question. The men who have, or do now, play a role in the endeavors of medical science, no matter how divergent their opinions may be, no matter how inharmonious their relations, results and manner of work, are only instruments for the accomplishment of a great task, and their personality and differences, as in all processes of evolution, are insignificant and inconsiderable as compared with the achievements sought for the benefit of mankind. Conflicts of intellects are as essential factors of medical evolution as are conflicts of intellects in other spheres of civilization, and as long as carried on in the broad, manly spirit that characterizes the man of truth, evidence and knowledge of cause and worth will eventually become apparent and will always receive attention from thinkers and honest delvers, and in the end must *conquer*, whatever may be the temporary influence of selfishness, greed, malice, commercialism and speculation, in the ranks of the original investigators or their followers and imitators, unfortunate conditions which of late are not wholly absent factors in the dissensions and retardary circumstances in medical science, particularly among the producers of organic preparations, such as antitoxins.

The study of the effect of antitoxin on the tuberculous phenomena in human beings leads us back to the active principle underlying immunization, an agent which is itself curative to a degree by virtue of its power to provoke the formation of that defensive force in the system. When Koch declared, publicly, for the first time, that the toxines produced in the culture of the bacilli of tuberculosis had a certain specific effect on the lesions of lupus, he did not explain what existed in tuberculine that could cause the modification. In fact, it seems that it was not then understood. We know now that it was because the tuberculin (or bacilli culture toxin) used by hypodermic injection in the patient suffering from lupus, provoked the formation of the antagonistic agent in the blood and tissues of the individual, which is now known as antitoxin, a name which is the general designation of nature's own remedy in the cure of microbian maladies. Tuberculin, then, is, to a degree, capable of modifying certain forms of tuberculosis, because it forces the affected organism to produce a certain amount of tubercle antitoxin. The inconvenience of it, from a practical standpoint, consists chiefly in the more or less severe reaction which follows the injection in the already seriously ill patients, and in the fact that in certain stages of certain forms of tuberculosis, particularly of the lungs, it seems to hasten the breaking down of tissue. It is claimed now that tuberculin, under other names, brought forth through the efforts of the Klebs school, may be so modified as to be free from the poisonous principle or principles. This theory seems supported by numerous animal experiments of Klebs, particularly in guinea pigs. Series of these have been published, and if we are to credit them as the reputation and scientific standing of the learned German in this country suggests, tuberculin, under its new name, deserves careful consideration. But if devoid of toxic principles, modified tuberculin (whether named tuberculocidin or antiphthisin) as curative or immunizing agent, is not free from grounds of criticism involving the very structure upon which the modifiers of Koch's original discovery have sought to erect a school of therapeutics in the treatment of tuberculosis. In the first place, the only thing that science can possibly suggest as curative in tuberculin is its very power of provoking the formation of antitoxin in the affected, and thereby a degree of immunity. Now what is the agent that forces nature to produce this defensive power? It is precisely the principle that causes poisoning, the principle that causes the fever and destruction, without which deleterious effects there would occur no demand on the injected body for the production of a defensive force. So it is that, notwithstanding the numerous animal experiments of Klebs (denied or not very well supported by other experimentalists) which seek to establish positively and definitely the therapeutic value of modified tuberculin, we find ourselves compelled to doubt their efficacy. In these days, when the ultra-progressive physicians clamor so loudly for experimental evidence in animals of results obtained in man before accepting the latter, it would seem that the apparently brilliant results of Klebs in experimental tuberculosis would settle the fact that antiphthisin is indeed an almost perfect curative preparation. But, unfortunately, the results in man, except under the direction of the originators and controllers of the remedy, do not support the claims of experiments on guinea pigs, as numerous and as thorough as they are pictured, and upon which I do not wish to reflect discredit.

On the other hand come numerous reports by numerous physicans, abroad and on this continent, in which is proclaimed the value of sero-therapy in tuberculosis, but which fail to support their claim by animal experiments, fully, in all the physiologic and pathologic details that are demanded by the profession, and yet they bring forth

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proofs of unmistakable recoveries of tuberculous patients. Not one of the experimentalists and investigators abroad and in America has succeeded in proving, with all the delicate niceties of Klebs in his work, that antitubercle serum cures tuberculosis in man because it postively does so in guinea pigs or other small animals. Noting the definite and positive results in human beings, they have seemingly neglected the animal experiments which are today demanded as a crucial test that serum can cure tuberculosis in man. But if apparently neglected, let me say to you that the laboratories interested in the question have not been idle. From the humblest to the greatest, there have been conducted experiments for a long period on this very point, and if the workers in that field are few who have dared to publish results and pronounce them reliable, it is not because of dearth of them, but because they realize the exceeding delicacy of the work and the numerous fallacies and deceptions that follow apparently proven problems in laboratory investigations concerning tuberculosis. The unequal sensitiveness of guinea pigs and rabbits to tuberculosis and the tox-albumin of the germ structure, the excessively rapid development of the tuberculous phenomena in some of them when inoculated, have been factors which have made curative measures uncertain and the results often vague and valueless. It is not true that one can *always* interpret properly the results of any form of treatment in experimental tuberculosis in small animals, and apply them to man as a reliable guide in therapeutic expectations. This claim which the profession wants demonstrated before accepting sero-therapy in tuberculosis is made by the rash or inexperienced, not by the careful and conservative, who have delved the longest in the problems in question.

Experimental tuberculosis in the guinea pig and accidental tuberculosis in man, so far as the nature and effects, locally and generally on the system, and the rapidity and fatality of their development are concerned, offer very different conditions to deal with in treatment, which should not be forgotten by those who must have animal experiments today to confirm the assertion of a competent physician that a man who has been cured a year ago is really cured.

However, animal experiments are indeed a necessity in the prosecution of the task undertaken by several to demonstrate the value of serum in the treatment of tuberculosis. The results thus obtained, both positive and negative, are scientific beacon lights of great importance—indeed, indispensable, both with respect to the immunization processes, and in the domain of therapy.

My own very imperfect work in the study of tuberculosis dates back several years, and my first efforts in the line of therapy in experimental tuberculosis in small animals began during the period of the furore that followed Koch's famous pronunciamento on the action of tuberculin in tuberculosis. With plenty of material, I carried on at the State University of Missouri, tuberculin treatment of several series of guinea pigs and rabbits for a long period, with indefinite, unreliable results, although fruitful in the varied information gained in so-called experimental medicine.

My experience with serum in experimental tuberculosis is much more recent, and was almost concomitant with tests of the same nature in man. Without facilities, the small animals inoculated with tuberculosis and afterwards treated with serum were very few until this year, when several series have been used in different experiments, many of which are still in progress. The report on these will form the basis of a paper which I shall have the honor to read before the Chicago Medical Society, within a short period. In this paper scientific details shall be given. For the purpose of this occasion of today, I shall mention in figures only, the results obtained to date with serum in man and beast.

In guinea pigs ten per cent. of the subjects inoculated with tuberculosis and then treated with serum from horses immunized by the use of only pure tuberculine were saved. Rabbits, by the same treatment, eight per cent. This was early in our experiments and indicated a meager therapeutic value in serum. Since then we have produced serum of much greater potency, by using not only tuberculin in producing the immunity of the horse but also the toxalbumin of the dead virulent bacilli, and even living cultures as will be seen further. Experimental tuberculosis under various circumstances was arrested with this serum in from 25 per cent. to 55 per cent. of cases, according to stages and lesions. In man the results of sero-therapy in 226 cases of tuberculsis reported with sufficient details to form a fairly accurate judgment were as follows:

		No. of Cases.
Pulmonary Tuberculosis.	Class 1. Destructive broncho-pneumonia and cavities	37
	" 2. Destructive broncho-pneumonia without recognizable cavities	66
	" 3. With diffuse febrile pneumonia with or without a destructive process	19
	" 4. With diffuse nonfebrile broncho-pneumonia with or without destructive cavities	19
	" 5. With circumscribed febrile broncho-pneumonia	35
	" 6. With circumscribed apyretic broncho-pneumonia	13
	Diagnosis not reported clear enough for classification	32
Hip joint tuberculosis		2
Laryngeal tuberculosis		2
Ovarian tuberculosis		1
		226

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In every one of these cases the diagnosis was verified microscopically.

During the treatment of these 226 cases the following results were obtained:

Effect of serum on fever: subsided, 60; reduced, 56; stationary, 26; not recorded, 84.

Effect of serum on night sweats: subsided, 69; unchanged, 17; not recorded, 140.

Result of serum on weight: increased, 125; unchanged, 15; decreased, 27; not recorded, 59.

Result of serum on strength: increased, 154; unchanged, 9; decreased, 24; not recorded, 39.

Result of serum on appetite: increased, 114; unchanged, 15; decreased, 31; not recorded, 66.

Effect of serum on local signs: disappeared, 46; mitigated, 58; unchanged, 29; not recorded, 93.

Effect of serum on tubercle bacilli: disappeared, 40; reduced 103; altered, 7; not recorded, 76.

Effect of serum on general well being exclusive of 40 cures: improved, 145; unchanged, 9; not recorded, 32.

Number of recoveries that seem complete and permanent	40
" apparent recoveries with existing lesions *in statu quo*	3
" improved, capable of performing usual duties	41
" improved, to a lesser degree	69
" deaths reported	32
" cases disappeared from observation or under various treatment	41
	226

As to the pulmonary cases the extent, stage and importance of the conditions at the beginning of treatment were as follows:

	Cases in Advanced Stage.	In Early Stage.
In Class No. 1	20	3
" " 2	33	6
" " 3	12	0
" " 4	9	0
" " 5	12	3
" " 6	7	1
	93	13

Not classified accurately enough for satisfactory description of stage, 115. These ranged between the first and third stage and belonged to various classes.

Now as to the immunization process and the necessity of measuring the antitoxic value of serum in units, as for diphtheria antitoxin, as it is asserted, Maragliano gauges the serum he uses. These points are also part of the paper I am preparing for the Chicago Medical Association, and I shall, therefore, only touch upon them here. First, immunization of the horse, or other animal, is produced more or less completely by injections of tuberculin, and intensified by injections of toxalbumins and may be still exalted by injections of living cultures in the circulation; the whole period of daily or alternate daily injections covering three to six months, sometimes more. The less natural immunity an animal possesses, the greater the value of the antitoxin produced by artificial immunization. The antitoxic value may be measured by the physiologic neutralizing power of a given quantity of immunized serum on a toxic dose of tuberculin and tox-albumins in a given weight of guinea pig. Notwithstanding assertions to the contrary among scientists considered authorities, and the very flattering comments of the American medical press thereon, the measuring of the value of therapeutic serums is not yet as reliable in practice as is that of diphiheria antitoxin. Among the causes which vitiate the application of Behring's law in tubercle antitoxin is the fact that healthy guinea pigs of the same weight respond differently to a given dose of tuberculin and tox-albumin of a given culture, and consequently the very basis of unit measurement is not absolutely uniform. On the other hand, the unit measurement has little practical value as a guide in dosage in therapeutics, because of the very numerous different forms of tuberculosis, the lesions present, the complications, the susceptibility of patients, and the more or less pronounced general effects on various important systems of organs in the affected, which are not subject to neutralization by antitoxin. The unit of measurement, however, is desirable and should be in vogue as far as it is practicable, and no pains should be spared to render it more thoroughly reliable and useful, if for no other purpose than that to establish a standard of defensive power as uniform as possible. This year's series of animal experiments includes researches on that line; and if I have been slow in using the facts accumulated and marking the bottles of our serum with a unit measurement, it is because no one realizes more fully than I do the uncertainty of experimental work in tuberculosis, and that I must back my conclusions with a voluminous list of reliable results, which the critics of competence may duplicate and the pretenders in medical science cannot refute, successfully, by mere quibbling or disputing statements, malicious reflections or meager and untrustworthy experiments.

Foreign investigators assert the reliability of their unit of measurement. As yet the assurances have not been confirmed by other than assistants of the originators of the systems, although our American medical press has with avidity accepted their statements on this point as on all others as being infallible, granting to investigators of our own country much less comfort, even though they present equally good results.

The earlier treatment is begun, the better the chances of recovery. It is essential therefore that we leave nothing undone to advance our knowledge of the earliest diagnostic signs of tuberculosis, in order that we may begin treatment very early when most cases may be saved, and that we leave

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no stone unturned to increase the power of serum.

Anti-tubercle serum is positively curative, and has passed the experimental stage, but it is far from perfect. In our reports we respectfully submit the good, bad and indifferent results. The basis of the reports are on file in our office and subject to the scrutiny of any honest physician, just as we open to him every department of our laboratories. From the experience of others and my own, it will be observed that only a relative number of tuberculous patients can, with our present knowledge of tuberculosis and anti-tubercle serum, be treated successfully. The very fact that many cases of different kinds have been cured by the exclusive use of serum in bad climates proves its curative properties. If it does not succeed, it is because of existing conditions, such as intolerance to serum injections of any kind, which is very rare; general destruction of physiologic equilibrium beyond repair; incurable lesions; mixed infections; etc., etc.

DISCUSSION.

The paper entitled

THE MANAGEMENT OF THE SENILE HEART,

read by JOHN W. BELL, M. D., of Minneapolis, was discussed as follows:

Dr. ABBOTT: I do not know that I have much to add to what has been said in the paper. In my experience in the use of digitalis it has not been as satisfactory for senile heart as it has been for other hearts that have been weakened, and I am getting year after year to rely more on nitroglycerin. There are some cases in which digitalis does very well, but I have frequently found when I relied on digitalis alone without much effect, they picked up with nitroglycerin all of a sudden; I could not obtain this effect with digitalis. It gives more work than the heart can do. I used to frequently accompany the digitalis with a small amount of nitroglycerin, but more and more as the time goes on I leave out the digitalis and increase the nitroglycerin, and many cases I have treated on nitroglycerin alone. Those old people are almost invariably constipated, and with their other troubles, their impaired circulation, the urates are not carried off to the extent they should be, and the constipation makes the trouble worse, and so they have more and more a retention of waste in the system that should be carried away, and the arterial pressure is also too high. I always insist that they shall keep the bowels open. I remember one old patient in particular, who, whenever he sees me, says: "Doctor, it seems to me you might be able to control this diarrhœa. I have three or four passages every day, and I know it weakens me." I try to so explain the state of affairs to him that it will satisfy him for the time being, but he will tell his trouble to some friend, and he will tell him to get some medicine that will help him. He will take it for a few days, but by and by his heart trouble will get worse, and the only thing to bring him out is the free use of nitroglycerin. So we have too many of these people habitually constipated. We have to see that their diet is of such a character that there are no more waste products to be carried away than necessary. In this form of heart trouble you can find no benefit from permitting rest in bed. This may be from the fact that with those people who lie in bed, the waste is not eliminated as it should be, they cannot fill the lungs as full as they ought, and after a comparatively short time spent in a recumbent position they have a little œdema of the lower portion of the lungs and a little diminution of the respiratory action; so I try to have these people keep about and exercise in troubles of this sort, where otherwise rest in bed would be advisable. With these old people I try to keep them up rather than let them get down and stay there. While too active exercise should be avoided, they cannot stand too long a rest in a recumbent posture.

Dr. HILL, of Pine Island: I think I can endorse what the gentleman has said. I was wondering when he spoke of the use of nitroglycerin what the maximum dose was, and how frequently he administered it. My own experience and observation in senile heart in old men points to the fact that they should be kept as active as possible. Let them take as much exercise and perform as much labor as they can do. Keep them out doors; I do not care if it is in the night, keep him moving. Also keep his bowels moving. And in regard to the administration of nitroglycerin, I have been giving it in heroic doses; that is, I have been giving about one-hundredth of a grain, not once a day as I used to, but two or three times a day. Of course, once in a while I give a saline bath; I think old persons are considerably benefited by it.

Dr. GREENE: I have been very much interested in the discussion and the paper itself, and particularly in the remarks of Dr. HILL regarding the exercise these cases should have. It seems to me quite important that any case of senile heart should be kept occupied. I do not know that I ever felt like advising active exercise, but take a case of that kind and shut him off from ordinary pursuits, and it seems to me it is the worst thing to do. I was interested in what Dr. ABBOTT said in regard to the use of digitalis. I have been accustomed myself to give the drug in very small doses, and in combination with the nitroglycerin, not giving more than ten minims of digitalis night and morning, about twenty minims in twenty-four hours. In that way the drug can be given a long period of time, and I think the result is very satisfactory.

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Regarding the use of strychnia, about one-twentieth of a grain twice a day I found very beneficial; patients got along very well. As to the use of saline baths in cases of senile heart, I personally have not experienced the same good results described in the paper, and while I was very much interested in that method of treatment, it seems to me, in cases of arterio-sclerosis, it would not be of the least benefit.

Dr. BELL: As to the exact pathological changes present in the so-called senile heart, much difference of opinion prevails. We certainly have present a weakened myocardium, depending, I think, primarily on a disturbed or perverted innervation or nutrition. In my paper I have used the term senile heart in a restricted sense, not including, on the one hand, previously existing valvular disease, or on the other those pronounced cardiac changes due to general arterial fibrosis or renal disease. Hence, in speaking of treatment, and especially of the efficiency of saline baths of a proper temperature, it was not my intention to convey the impression that I would treat advanced cases of arterial fibrosis likewise.

Dr. SWEETSER: I would like to call special attention to the question of diet. I think if old people are allowed to eat as they did in early life, the senile heart will become much more marked. I have had old people, whom I have carried along upon a milk diet, get along very well for a long time. I think the fact that we are all so sure that rest in bed is bad is simply because we are trying to keep up the nutrition of the general system. This is different from heart disease or arterial sclerosis; it is simply a weakening of the heart, and I think the main thing is to keep the condition of the body at as high a point as possible, and for that reason I think the main treatment should consist of strychnia and a nutritious diet, but a diet that does not call for too much labor. I think Dr. ABBOTT'S idea of keeping the bowels free is a very important one in treating those cases.

Dr. J. H. STUART: I did not hear the paper read by the gentleman, but I listened to his definition of the term senile heart, and it suggested two or three thoughts to my mind. Of course, if we are to exclude the organic changes from this condition, then we are very much limited in our discussion of the matter, because often in old people, and even in young people, we have the organic changes in the endocardium, and if we take the term senile heart it must be relative in its meaning, or we may have the condition designated senile heart in a very young person, and it is said that we are to throw out the organic changes, such as hypertrophy and dilatation, and the relation between the heart and the arteries, arterial sclerosis, then we must consider whether we do not have simply the effects of enervation of the heart, and as Dr. SWEETSER has suggested, it is necessary to keep the patient under proper nutrition. Anything that will produce disturbance of enervation, a disturbance caused by indigestion, will throw the heart out of its rhythm, out of its proper action. I think the management of this matter one of the most important things to be considered, and it would be a good idea for all business men, men actively engaged in their offices and doing much brain work, to have frequent examinations made to find out whether they are not beginning to have a disturbed heart action, so as to put them on their guard, and there is no question but that a large amount of cardiac disturbance could thus be discovered. Old people, and others not very old, commit errors in the use of tobacco, the excessive use of tea and coffee, which disturb the heart action and impair the condition of the arteries. I cannot consider the disturbance of the heart without considering the condition of the arteries. In elderly people the capillary condition is more changed than it is in younger people, hence a greater task is laid upon the heart in order to keep up its duty so as to carry on the circulation of the blood; but that is a condition we cannot very well overcome by any advice, except to maintain the highest form of health by a proper amount of exercise, proper diet, etc. I think there is no question but what improper diet and alcoholism, together with undue mental labor and exercise, contribute most commonly and largely to cardiac derangement in people who have reached maturity and passed beyond middle life, and the best thing to do is to see that the hygienic relations are put in the best condition.

Dr. TAYLOR: I do not want to take up the time of the convention, but it seems to me there can only one or two kinds of cases come under this term of senile heart. One must be due to muscular degeneration and the other to ennervation; that is what I understand by senile heart. We speak of senility; I think the heart partakes of that senile degeneration. In most instances this is due very largely to a degenerative process in the circulatory system outside of the heart, in sclerosis, thus supplying the heart imperfectly with nutrition. The other class of cases, it seems to me, are dependent upon ennervation. I believe they are largely due to alcoholic stimulants and tobacco. They may be due to the retention in the system of waste matter. In the first class of cases, which are due to muscular degeneration, anything that will aid the muscular nutrition will aid the patient. The food has been spoken of. I believe that a very important factor in that is oxygen. The better a muscle is supplied with oxygen the more nutrition it will receive, and the more capable it will be of doing its work. I believe arterial or vascular sclerosis, as explained by this gentlemen here, is largely benefited by the use of baths; it serves to draw the blood from the centre, and I have, in those cases first spoken of,

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derived but little benefit from the use of digitalis. I have derived some benefit from the use of iron and strychnine. The second class of cases were all benefited from the use of digitalis. I have been in the habit of using it for years and received marked benefit. The use of nitroglycerin is beneficial in both classes of cases, and I have used it, and am using it in cases now under my care, in doses of one-fiftieth of a grain every two or three hours.

Dr. STINCHFIELD. I have only a word to say. I have been very much pleased with the paper and its discussion. The gentlemen have spoken to the point, and have given proper treatment to the patients, in the condition in which they happened to find them. I think, as a matter of fact, we are oftenest called to senile hearts on account of dilatation, when I depend upon digitalis. This sometimes is inoperative, if there is too much accumulation in the veins, and in that case I agree with the gentleman who believes in the use of cathartics. I have seen the heart in this condition relieved of its burden promptly by the use of ten grains of calomel. If there is a good deal of arterial tension I depend upon nitroglycerin for temporary use. I think the iodides are better for persistent effect, but for quick action much inferior.

Dr. BELL: I will not detain the section by continuing the discussion farther than to say that the paper was written for the purpose of calling attention to a condition frequently met with in persons between forty and sixty years of age, a condition frequently operlooked or imperfectly understood, yet amenable to treatment. In closing I desire to again emphasize the efficiency of the subcutaneous method of treating all forms of pronounced cardiac insufficiency and especially the senile form. At that time of life those patients should have at our hands more consideration than they have had in the past. In reference to treatment, I should advise the subcutaneous method of treatment in those forms of diseases, as I believe it to be the most scientific method of treatment we have at our command.

The symposium upon

PLEURISY,

consisting of the following papers:

ETIOLOGY AND PATHOLOGY,

by H. B. SWEETSER, M. D., of Minneapolis,

DIAGNOSIS AND TREATMENT,

by E. J. ABBOTT, M. D., of St. Paul,

TREATMENT, MEDICAL AND SURGICAL,

by A. W. STINCHFIELD, M. D., of Rochester, was discussed as follows:

Dr. BELL: These concise and practical papers are now before the Society for discussion. I should be pleased to have Dr. JOHNSON, of Chicago, open the discussion.

Dr. JOHNSON: Mr. President, and Members of the Society: I have listened to these papers with a great deal of interest, and they call attention to a number of points which I think should be borne in mind by all of us who come in contract with cases of this sort. The etiology of that disease has been very clearly set forth, also the symptomatology, the diagnosis and treatment of the disease. All physicians see a great variety of cases, and it is a very difficult matter to determine what our case is, and upon that determination depends what we should do for it. There are some mechanical conditions that must be attended to, no matter what the case may be. The medicinal treatment depends largely upon the cause of the disease. There is one method of promoting the diminution of the fluid that was not spoken of, I think, and that is by the free excitation of the skin function. I have in mind a case of pleurisy that occurred in the course of malarial fever. The case was not in my own practice, but I know the circumstances of the case. It was that of a young man who had had gonorrhœa, and in the course of the gonorrhœa an ague developed, and in the course of those two diseases he had pleurisy with extensive effusion. Whether the pleurisy was due to the gonorrhœal trouble or due to the ague, I do not know. During the time of the onset of pleurisy the gonorrhœa was in abeyance for the time being. In the course of ten days, I think the doctor told me, there was a remittance af the ague, with very profuse perspiration, and in the course of several repetitions of the effusion he entirely recovered, showing that active excitation of the skin function may be made use of by a pathological process to diminish the quantity of fluid in the chest cavity. The point made by the gentleman as to the diminution of fluid in the course of treatment is a strong one. I may use diuretics or cathartics, if the patient have free use of water, but if the patient is limited in the amount of fluid taken, or is put on a dry diet, then I may establish some degree of success in the treatment for the absorption of the fluid. In regard to washing out the cavity of the pleura, that is a matter of much discussion. There are very honest differences of opinion in regard to the safety in washing out the chest in pleurisy. In the large majority of cases of purulent pleurisy it certainly seems necessary to wash out the cavity of the pleura, and drain it, or treat it as any other abscess. It is sometimes found dangerous, and sometimes almost beyond relief, as in the following cases: One was the case of a child not over 15 months old, I think, the son of a physician. An uncle was also a physician. The child had pneumonia with a very extensive effusion; the chest was opened and the pleural cavity washed out repeatedly, and the little patient seems

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to be doing well. The temperature dropped from 105.6° several degrees, and the child seemed to be steadily improving, but one day, when they were washing out the chest, the child suddenly collapsed. The patient seemed to be absolutely pulseless, and the abdomen became suddenly very much distended, so much so that the father said to the uncle, "You must open the abdominal cavity." He opened the stomach and a quantity of gas escaped, and some fluid and pus. I was not there at the time. The little child was put back to bed in a supine position, but with the head down, resting on its back. There was no further trouble with the stomach; the pleural cavity was all washed out again, and today the child is as strong and healthy as any I ever saw. In chronic pleurisy, where there has been a discharge for some time, the chest has been drained for a long time, and where the discharge continues to be fœtid, the patient continues to suffer and seems to be losing ground continuously, in spite of the care that is taken to cleanse the cavity. Tonics and chloride of iron are extremely useful. I have seen the character of such a discharge changed almost miraculously from a fœtid to a sweet state, and the patient restored to health and vigor, where before everything seemed to have been so unfavorable.

Dr. ANDREWS: Pleurisy and the effusion is something I have given considerable attention to. I was very glad to hear that Dr. ABBOTT had himself had the experience he had in respect to treatment. It is often the case that when you call in consultation physicians who have had a great deal of experience, yet who will always advise in serous effusion to let it alone, poultice the outside, blister the outside, give iodide of potassium, or use the mercurial liniments or something of that kind. Every physician who has had much experience with pleurisy knows that those things do but little good, and are used more to amuse the patient and let the patient and his friends feel that something is being done, than with the belief on the part of the physician that great good will result from such treatment. In reference to the question of operative treatment in cases of serous effusion I am speaking of now, I would ask myself this question, if I was satisfied there was a considerable quantity of serum in the cavity, what harm will it do this patient to open the chest to remove the fluid? Even if the results were almost nil, as pointed out by Dr. ABBOTT and others, it certainly will, in many cases, prevent a permanent collapse of a portion of the lungs; it certainly will relieve our patient; it certainly will give him freer respiration; it certainly will hasten his recovery, and in view of all these facts why medicate the patient? Why put on plasters, and blisters, when a common, simple surgical operation will hasten recovery and practically in no way jeopardize the life of the patient? We can perform no operations in surgery, no matter how slight, without a little risk. Not very long ago I myself and another physician sat up all night and worked faithfully over a patient who was almost bleeding to death, and who would have bled to death if we had not used active means to prevent it, from the pulling of a tooth. In cases of purulent pleurisy, it was my fortune, perhaps, to have more than a usual number of cases of purulent pleurisy. I saw a great many cases, some of my own, some that were treated by other physicians, and some that were not treated by physicians at all. I adopted the plan early, with a very efficient brother physician, Dr. Steele, I adopted the plan of opening the chest cavity and washing it out. I remember the case of a young lady. We made a very small opening, but there was no escape of pus except during the time that we were washing out the chest, and we did that twice daily, yet when we got to the patient we found considerable accumulation of pus and elevation of temperature. As soon as I would make an opening and evacuate the pus thoroughly the temperature went down, and she made a good recovery. In some other cases we tried the experiment of infrequently washing the chest cavity, the temperature would rise, the fever would increase, and the patient would not do so well; but in every case where we washed the chest frequently, kept up a good drainage, we kept the temperature down and our patients made a good recovery. I am today a firm advocate of frequent washings of the chest in purulent pleurisy. In some cases bad results may follow, but I believe in many cases good results have followed, and if other cavities, where there is an accumulation of pus should be washed out and disinfected, why not the pleural cavity? If the uterus, why not the pleural cavity? We cannot afford to neglect the duty of washing out the chest in those cases. I use in almost all cases bichloride of mercury, and with the treatment I have used the result certainly was good in a considerable number of cases, and I do not say it boastingly becuase I was treating them, because Dr. Steele was treating some, but it is true that all of them made a good recovery, and from that experience, and from the experience I have had since in like cases, I am a firm believer in the free opening and the free drainage and the free washing of the pleural cavity in purulent pleurisy. (Applause).

Dr. GREENE: I would like to say a word in regard to the diagnosis of pleurisy. Dr. ABBOTT'S paper was so good and so practical that it left me under the impression there was little more to be said on the subject, but there are so many different features connected with the disease that it is a very fruitful subject for discussion. There is hardly a sign of pleurisy which may not be absent, at one time or another. The pain may be in the intercostal nerve and yet is often attributed to the stomach, and in two instances I know of, the most intense pain was experienced in the left arm.

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The paper on

THE RELATION OF THE BACTERIOLOGIST TO GENERAL MEDICINE,

by H. M. BRACKEN, M. D., of Minneapolis.

Dr. JOHNSON, of Chicago: I want to say one word in regard to what the doctor has said about the impositions which some practitioners practise upon their brethren in asking them to make pathalogical examinations in general without asking any compensation whatever. It is altogether too common, and it is very unjust. We have in Chicago a pathological laboratory which is educating medical practitioners to understand that such services are valuable and should be paid for. The bacteriologist and pathologist are men skilled in making clinical examinations of all kinds, and the common practitioner who is asking such men to make examinations free is doing wrong, and I am glad to say that the practice is becoming less and less common.

Dr. BELL: The paper is a very practical one. It justly sets forth the wrong that physicians do in asking someone skilled in a certain kind of work to do it without any compensation.

NERVOUS DISEASES.

H. A. TOMLINSON, M. D., Chairman.

PATHOLOGY OF NERVOUS CONDITIONS IN RELATION WITH GENERAL DISEASE.

BY H. A. TOMLINSON, M. D.

Superintendent St. Peter State Hospital.

St. Peter.

It would seem to be unnecessary to have to call attention to the part played by the nervous system in general disease, and yet we constantly find this relation misunderstood or ignored. General practitioners and those specialists whose work does not bring them in contact with marked manifestations of nervous disease, rarely take into consideration the relation of the nervous system to the diseases they are called upon to treat or the influence of the general disease upon the special function; their constant reaction upon each other; or the influence of lowered nervous tone in retarding and sometimes preventing reaction from general somatic disturbance or special visceral implication.

In the distribution of labor among the different vital organs each one either furnishes its share toward the nutrition of the whole, acts as a carrier of nutriment, or is engaged in the elimination of waste material from the organism. While the nervous system, taking no direct part in any of the vital processes, still directs them all, yet is entirely dependent upon the rest of the organism for the means of maintaining its activity and eliminating the waste involved. It follows then, in order that the nervous system may maintain its integrity, all of the vital organs must function normally, and as a corrolary, that if they do not fully perform their functions the nervous system must suffer to the extent that it is deprived of nutrition or fails of having the waste products of its activity carried away. Consequently if such impairment results, the power to direct the somatic activities is lessened and the other organs are further prevented from functioning normally, while any of them which is diseased will have its potentiality further reduced by the impairment of nervous function, and will in its turn to that much greater extent interfere with the proper functioning of the nervous system. It would appear, then, from these obvious facts, concerning the relation of the nervous system to the rest of the organism, that while the visceral disease may be most conspicuous, it is often the least important, because the persistence of the disturbance of the nervous system is the main factor in keeping up the constitutional disturbance; for we must not forget that we recognize diseased conditions by their general effects, which we see first; our attention being called to the special organ involved by the perversion of general conditions the result of its aberrant functioning. Furthermore, we recognize the return of the special organ to its normal functioning by the subsidence of the general symptoms. Those general symptoms, too, are most commonly manifestations of disturbed or preverted nervous functioning; such as weakness, pyrexia, headache, pain, insomnia, restless irritability, emotional disturbance and even delirium.

Goodhart[1] says: "As year succeeds to year of life I become more impressed with the widely prevailing influence of the neurotic element in the production and carriage of disease. And it is my own opinion that it is largely more so than in former years. I shall not attempt to prove this, for I feel confident that figures could be made to do service either way according to the bias of the manipulator. I therefore simply give it as my opinion, worth no more, but worth no less, than that of any other individual who has had an equal opportunity of observing. For let me remind you, the conclusion that I had come to has determined the subject of these lectures; it was not formed after I had settled that question. If I look through my notes of cases that I have seen there is no group so large as that of the neurotic in one form

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or another, and I really do not think I have exaggerated this feature. I believe that insanity is on the increase; but I refuse to be confined, in speaking of mental disease, to those grosser forms that require to be committed to the hospitals set apart for such cases. Incidentally I may say too that I believe that the grit of the English constitution has lessened in robustness; and if the question Why, then, is the average duration of life longer? seems at first all too pertinent for the maintenance of that contention, a very little reflection will convince any one that no great weight attaches to it; for in both cases—physical and mental death to bring both cases at once into the same line—it is more than probable that the last extremity is averted by our greater care of life at the present day, and that the average is lengthened out by the larger prevention of preventable diseases. Yet men and women may drag along more self-conscious, more oppressed and weighed down by trivial ailments; less ready to step out with the spontaneity and joyous liberty and power of healthy life, so that if one man might say that today there is less of capital punishment, there are ten men who would make answer: Even so! but there is more of penal servitude and of the treadmill."

It is to the part of the subject referred to by the writer quoted above that I want to call your attention, and to give you, for what it is worth, my conception of the pathology of this relation between the nervous system and the rest of the organism in general disease, based upon my observations among the neurotic and insane.

The simplest manifestation of disease we are called upon to deal with is the general disturbance connected with indigestion and constipation, producing auto-infection.

Beginning with children, because in them the nervous system is most unstable, I need not tell you how widely different will be the degrees of general disturbance produced by these simple perversions of function, varying from restlessness, pain and vomiting, with slight pyrexia, to hyperpyrexia, meningeal congestion, convulsions, coma and even death. Now why this difference? I believe it to be due to varying degrees of instability in the nervous system of the child, so that the toxic substance in the most stable nervous system acts only mildly as an irritant, while in the most unstable it produces violent explosions of nervous energy, exhaustion and paralysis.

The exanthemata in their turn produce widely different degrees of nervous disturbance among children, and we commonly say that in this or that case the nervous symptoms were most marked, giving rise to intense restlessness, headeache, delirium and even coma. But why? Suppose instead of contenting ourselves with the the observation of the immediate diseased condition, we study the history of the child from birth, the character of the labor with which it was born; the condition of the mother at the time of conception, during her pregnancy and while nursing the child; the life history of the parents and that of their relatives, both direct and collateral. Just as we find them widely differing in the proportion of constitutional or acquired causes of defective or unstable development, will we find the explanation of the varied manifestations of nervous involvement, the plastic cerebral mass reacting more and more excessively and to slighter stimuli according to the degree of instability. It is well to bear in mind also that excess is as much a defect as is deficiency, and that the most highly organized is always the most unstable.

During the whole period of development up to and beyond puberty the disturbance of the nervous system is a constant factor in any form of general disease and its manifestations always conspicuous. During the two principal epochs of the child's development, this is especially marked, *i. e.*, during second dentition and at the period of puberty, and often at these periods the foundation is laid for arrested or irregular development, especially in those subjects who have become primarily unstable for want of recognition of the relationship of the nervous system to general disease and the interdependance of the perversions of function common to both.

Maudsley[2] says: "How far each visceral or thoracic organ can, like the sexual organs, determine its specific mood or tone of feeling directly, and indirectly its accordant manner of thought, and how far therefore each may determine the character of the dream of sleep and the delusion of madness, it is impossible to say with any certainty. But it is conceivable that all visceral organs may have their several relations with modes of feeling, as definite and constant in character as the relations which the special senses have with forms of thought. Certainly the moods of feeling and thought which accompany disease of the lungs are very different from those which accompany abdominal disease; and inflammation of the gastro-intestinal mucous membrane notably occasions a gloom and anxiety which are not felt in inflammation of the bronchial mucous membrane. Speaking generally, there is a tone of despair in disease of the abdominal viscera. The surgeon who, having performed an operation on the abdomen, has in mind the possible occurrence of peritonitis, views with apprehensive alarm a look of anxiety in his patient's countenance, before he finds the signs of local inflammation. Hitherto the mental symptoms of bodily disease have not been studied systematically, and one may search through treatises filled with elaborate descripitions of the symptoms, courses and morbid anatomy of them and not discover that they have any mental symptoms at all. Nevertheless patient and accurate observation of them might be of great scientific value."

The history of the primary degenerations occur-

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ring during adolescence, which come under our care, abundantly prove this relationship between general conditions and perversion of nervous functioning, the beginnings of which are seldom recognized, and even if recognized not appreciated until too late. Irritability and restlessness, headache, violent explosions of temper and imperious wilfulness, with inability for continous effort tell their story, as do their opposites, lassitude, dullness, and even stupidity with confusion, perverted appetite, constipation and abnormal sexual excitement. Happily these conditions are often temporary and disappear, but unfortunately more often they only subside for a time, to reappear in exaggerated form during late adolescence and early adult life; as concomitants of disease of the pelvic organs in women, manifesting themselves in hysteria and neurasthenia; although some women escape until the exigencies of social life or the strain of maternity bring on some form of nerve storm, or permanently sap the resistive power of the whole nervous system, the mildest result of which is the new woman or the one whose morbid egotism feeds on religiosity. In men the results are less varied in type, but even more disasterous in themselves. The craving of the unstable constantly warring nervous system gives its victim no rest. Sexually he may pass through all the degrees from masochism to satyrism or sadism; although he more commonly stops somewhere midway. Again alcoholism may be the manifestation of his aberration, and again epilepsy. While in the cases where the defective development is more marked, primary degeneration is the result; beginning with confusion and apprehension and soon ending in hopeless dementia, or at best in persistent insanity with persecutory delusions based on morbid egotism. Numberless minor perversions also occur which become apparent only when looked for and which are accepted by parents and friends because they have become gradually used to them. The imperious will which results from inability to appreciate anything except in relation to self, enables this class of people to dominate their surroundings, and their eccentricities are accepted as a matter of course, without thought as to their origin. Now how do these conditions come about and why are they so important a factor in relation with visceral and general disease? I believe it may be accepted as a fact that the principal physical result of modern social conditions has been the disproportionate development of the nervous system at the expense of the rest of the organism, and that as a result of this unequal development the vitality of the whole organism has been lessened, while the nervous system requiring a disproportionately large share of nutriment, and failing to get it, has its potentiality lessened and is unstable, without normal relation to the rest of the organism; or in physiological terms its irritability is increased while its capacity for reconstitution is lessened, the result being a continuous tendency to react excessively to ordinary stimuli. Such being the case with ordinary conditions in the individual's surroundings, how much greater will be the effect when the conditions are extraordinary? Besides, as has been abundantly proved by investigation, those conditions which exist as defects in one individual may be produced temporarily by a state of the organism which is sufficient to impair its vitality and derange the relational activity of the different organs. Even a high temperature, if prolonged, will bring about complete neurasthenia, while auto-infection from the retention of products of destructive metabolism may and does bring about the gravest forms of disturbance in the organism simulating and even producing, if persistent, all forms of organic visceral affection, especially in the kidneys and heart.

There is one diseased condition in which this relationship of the nervous system to general disease is so conspicuously shown, that more than any other it has served to call attention to the nervous element in disease. Popularly known as "la grippe," or "influenza," it was first thought to be an affection of the naso-pharynx and at most the lungs; then to be a general affection of the digestive or respiratory tract; but now known to be a profound general intoxication, or as some think, an infection, with manifestations most varied and sequelæ most disastrous, principally affecting the nervous system.

Sir Dyce Duckworth[8] says: "The sequels of this disorder have only been studied with care in the course of the epidemics which have prevailed in the last seven years. They escaped the attention of the older observers. They are very numerous. It may be fairly affirmed that many of the gravest characters of the malady occur after the acute stage has passed away and when convalescence is apparently assured. I think there has possibly been exaggeration in respect to some of the alleged sequels of influenza; still they are, as I have said, numerous. The general asthenic type of the disease is well recognized. The enfeebled mental and bodily states left behind it have been forcibly and sadily brought home to most of us too late, both in our own persons and in our patients and friends.

"The nervous variety is apt to lead up to many subsequent troubles. A rapid denutrition of nerve centres is more or less common in all cases presenting any severity in the early stages. Neurasthenia may prevail for one or two years subsequently. Polyneuritis is a common sequel. The arms may be paralysed, with both motor and sensory disturbance, and wrist-drop may occur; moreover, the same process may occur over large areas. Neuritis may involve cranial and other nerves locally. Encephalitis, myelitis, sclerosis of various tracts of the spinal cord, neuralgia, especially the intercostal variety.

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"Somnolence, or extraordinary drowsiness, with hebetude, is a noteworthy feature. Headache, vomiting and various mental disorders may occur. Melancholia leading to suicide is by no means uncommon. Mental incapacity long remains, and many patients affected in middle life tell of inability for efforts, mental and bodily, that were easy to them previously."

The fact that the microscopic changes in the cortex of the brain and the spinal cord have not been studied in cases of general disease resulting in death, leaves us practically in the dark with regard to the presence or absence of morbid histological changes, and I have not been able to find any reference to bacteriological study of the cerebrospinal fluid or cortex. Until these two methods of study form a part of each post mortem examination, there will be no definite knowledge concerning changes in the nervous system in general disease, and we are compelled therefore to rely upon inference drawn from analogy.

From 1889 to 1891 Hodge at Clark University carried on his now well known experiments on the influence of fatigue upon the brain cells, showing itself principally in contraction of the nucleus and vacuolation of the cell body, *i. e.*, an over-reaching of repair by waste, with consequent failure in reconstitution, and therefore reduction in functional capacity. My own studies, not yet published, show an exaggeration of this condition in those dying in early stages of acute insanity. It is reasonable therefore to assume that this process of cell fatigue is going on in every individual suffering from disease, varying in degree according to the amount of interference with nutrition and aggravated by any source of over stimulation of the nerve cell; while the further effect will be intensified by the reaction resulting from the impaired functioning capacity of the diseased organ. This is especially so if the source of failure of nutrition and auto-infection be in the alimentary canal. Every practitioner of medicine knows how important free movement of the bowels and activity of the skin are to comfort and sound sleep, in patients suffering from serious illness, and how doubtful is the prognosis when the patient cannot digest and assimilate food. It is also well known how rapidly the man goes to pieces when he tries to goad the nervous system to renewed activity by stimulants, and then tries to relieve the strain by further destroying the power of reconstitution in the cerebral cell by paralyzing it with so-called sedative drugs. Nothing yet discovered will reconstitute the nerve cell but food, or relieve its excessive irritability but elimination of waste material. The lesson to be learned from this would seem to be obvious, and if this was not a paper dealing with pathology I might dilate indefinitely on the importance of these facts in relation to therapeutics.

This brings me to the point which I have written this paper to elucidate, *i. e.*, that the study of general disease should also be the study of nervous disease, and the study of nervous disease is in its broadest sense the study of general disease; and while the student of nervous disease cannot afford to be without knowledge of general medicine, neither can the general practitioner afford to be without a knowledge of the processes of development and degeneration, sufficient to familiarize him with the principles upon which the study of nervous disease is based.

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NERVOUS SYMPTOMS OF BRIGHT'S DISEASE.

By A. W. Stinchfield, M. D.

Rochester.

Bright's disease replaces that condition of good health, and that feeling of well being to which all aspire, by a set of symptoms addressed largely to the nervous system. Whether the cause be a single substance, where it originates and how it does its mischief, have ever been fruitful sources of discussion. Some parts of the controversy have been pretty well settled: that it is largely auto-infection or intoxication; that in most cases there may be many toxic agents instead of one; that the blame falls largely upon the depurative action of the kidneys; that urea and its derivatives play a leading part. The name uræmia was long ago given to this condition, from the idea that urea was the active agent, and it has been adhered to for want of a better. Sooner or later, to all forms of Bright's disease, anæmia comes to be an important result leading in its protean train a multitude of unpleasant phenomena, causing morbid hyperæsthesia to every part endowed with feeling, turning pleasurable sensations of our special senses into pain and suffering. Nor is irritability of extreme anæmia, which is often produced, confined to the sensory apparatus, but involves the entire motor apparatus as well, giving rise to increased reflex irritability and even convulsions. Thus from Bright's disease we have united in their pernicious effects upon the nervous system anæmia and faulty depuration. Among the manifestations of this many sided disease are headaches of a severe type and very persistent, which, indeed, very few sufferers from this malady escape entirely. Vomiting in the morning before food is taken of tenacious mucus is very common. Giddiness is

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often a very constant and harassing attendant. Somnolence is a symptom of much importance, for it prevents rest so much needed for proper recuperation. Blindness, both transient and permanent, may take place. The former, amaurosis, comes and goes without producing any observable effect upon the fundus of the eye; but the later, a serious condition, albuminuric retinitis, with or without hemorrhage, is readily recognized with the ophthalmoscope, and is permanent.

Deafness is sometimes met, but is seldom long-continued. These features may continue for a short time or persist for years, in some cases without marked change, when, perhaps, without a note of warning, convulsions of a most terrible form, followed by coma, will be ushered in. The convulsions are of the true epileptic type, attended by complete unconsciousness, biting of the tongue, foaming of bloody mucus from the mouth, and stertorous breathing.

Results of high arterial tension and the vascular degeneration are to be considered. The hypertrophy of the left ventricle and elevation of pressure in the arterial system, so necessary to the secretory performance of the atrophic stage of both parenchymatous and interstitial nephritis, often produce alarming symptoms from the nervous system by means of increased cerebral pressure, giving rise to hyperæmia of the brain, and sometimes rupture of vessels, to which the kidney disease has brought a degeneration, thus lessening their power of resistance, and giving us cerebral hemorrhage with resulting hemiplegia.

Itching of great persistence should be mentioned, as it at times is so intense as to rob uræmic patients of all rest and sleep, and may be an evidence that the end is not far distant. Asthma is another neurotic affection that may have uræmia for a cause. The attacks are paroxysmal, coming usually at night, with intervals of complete freedom.

GENERAL CONDITIONS ASSOCIATED WITH CHRONIC DISEASES OF THE SPINAL CORD.

By W. A. Jones, M. D.

Minneapolis.

The recognition, appreciation and significance of symptoms of spinal cord disease depend upon one's familiarity with the anatomical structure and physiological function of the cord, the relation of the cord's segments to the vertebræ, the distribution of the spinal nerves from the segments, and the differentiation of the symptoms from those of the cerebral disease.

As our knowledge of the cord and its functions is only approximately correct, we cannot always positively diagnose the location and character of disease. We fail at times to appreciate many well known facts. First. That the cord ends at the upper border of the second lumbar vertebra, the caudal nerves occupying the lower end of the spinal canal, and may be the seat of disease without extension or invasion into the cord. Second. We fail to take into consideration the fact that the blood vessels in the cord may be the first point of attack in beginning disease, as a syphilitic endarteritis. Third. Disease of the cord may be due to a degeneration of the neurons, axis cylinders or end fibres in the periphery. Fourth. We overlook diseases primarily outside of the spinal column, inside of the bony canal or in the coverings of the cord; caries, tumors or meningitis, which may give rise to symptoms indicative of lesions involving or limiting itself to special areas or tracts; the so-called system degeneration.

It is comparatively easy to understand and diagnose the familiar forms of cord disease if we bear in mind the functions of certain and definitely known tracts or paths, as symptoms depend upon the location and character of the disease.

It would be impossible in a paper and in a symposium of this kind to give an exhaustive description of the various diseases, and it is my purpose to compile only the more commonly found symptoms in common diseases.

The cervical and lumbar enlargements of the cord are more frequently the seat of disease than the dorsal region. The symptoms which implicate the upper extremities point to the upper enlargement, while disturbances of the pelvic viscera and legs point more definitely to the immediate vicinity of the lumbar enlargement. If disease invades the anterior horns of gray matter only, we have paralysis of motion and atrophy of muscles, while that invading the posterior horns produces peculiar disorders of sensation, while trophic changes are more or less pronounced if either part of the gray matter is the seat of disease. The paths which conduct pain and temperature sense are located around the central canal of the cord, and connect with, and are part of, the column on the lateral and anterior surface, known as Gower's tract, while the paths for tactile impressions are found in the post-median columns outside of the gray matter. Those for muscular sense are situated in the post lateral surface outside of the posterior roots of the spinal nerves. The white substance is made up in part of long tracts which connect the brain with the periphery, the most important of which are the pyramidal columns direct and crossed, which connect with groups of cells in the anterior horns, making this a fairly direct line of communication from the motor areas in the cerebral cortex, which, when diseased, give rise to incoördination without paralysis, except when the degeneration is com-

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plete. Atrophy of muscle occurs only when the cells in the anterior gray matter of the cord is involved. The remainder of the white substance in the anterior and lateral portions of the cord are mainly connecting fibres joining segments together.

Paralysis of motion, atrophy of muscle and varieties of anæsthesia point to definite landmarks, while pain, incoördination, ataxia, spastic conditions, contractures and disturbed reflexes are found in diseases more extensive or in combined forms. The lesser symptoms—irritation, girdle sensation, ill-defined and subjective sensory disorders, weakness or tire—may be wholly subjective or due to disturbances of nutrition, or may be the forerunner of beginning organic changes, outside of or within the canal.

Paralysis of motion varies in degree in different diseases. In anterior poliomyelitis, for instance, motor paralysis is extensive and apparently complete at first, due in part to "shock" of the neighboring structures. After a few days the cord recovers from the shock, and only the muscle group supplied by the group of nerve cells in the diseased segment remain useless. If within two weeks there is no response to electricity, faradic or galvanic, it is fair to presume that the reaction of degeneration is complete. In time, however, there may be partial restoration, and in a few instances recovery is reported. Trophic changes in joints and skin are frequently present, manifested by changes in nutrition and retardation in growth, due to the invasion of disease in the gray matter.

Paralysis of motion in amyotrophic lateral sclerosis means an involvement of the anterior gray horns. In syringo-myelia, also, the same conditions prevail from gradual extension of pressure or disease. In progressive muscular atrophy there is a gradual progression of paralysis of motion, but due to a degeneration of axis cylinder processes, and later associated with atrophy of corresponding nerve cells. In transverse myelitis paralysis of motion is usually complete below the seat of lesion, although if limited to the dorsal region, there may be partial motion in a few groups supplied by the lumbar enlargement; for the same reason the bladder and rectum may escape serious implication. But in acute myelitis in the lumbar enlargement the paralysis is complete.

In chronic and diffuse myelitis the paralysis is retarded, slow in onset and irregular in its distribution, and corresponds to the segmental control. Atrophy of muscle usually accompanies paralysis of motion when the seat of disease is the gray matter. In the above mentioned diseases the atrophy varies with the form and extension of the disease. A transverse dorsal myelitis causes atrophy of muscles supplied by the diseased segment. If atrophy occurs in muscles supplied by a lower and sound part of the cord, it is due to nonuse. A transverse lumbar myelitis is accompanied by more extensive atrophy, and is the result of the death of the segment alone. For some unexplained reason the flexors are usually implicated more than the extensors. Occasionally the reverse is the case.

Disorders of sensation, if due to organic changes, vary according to the seat of lesion. In that most common and familiar disease, tabes, the disorder is usually limited to tactile or touch sense, and therefore must involve those fibres which carry such impressions. Eventually the post-median columns are sclerosed, and tactile sense impaired, retarded or abolished. Should the disease extend, other sensory symptoms may present themselves, such as disorders of pain and temperature, and particularly of muscle sense. In syringo-myelia there is usually loss of pain and temperature sense, consequently no pain and no accurate appreciation of cold or heat within certain thermometrical limits. These disordered areas are irregularly distributed, and sometimes distinct in outline, in some cases only one may be lost and the other retained. In acute transverse myelitis all sensation below the lesion is abolished, while at the level of the disease there is usually hyperæsthesia. In the other forms of myelitis the disturbances vary with the seat of disease; some sensory areas preserved and others absent or abolished. The disturbances of sensation are so varied, particularly when due to either cord disease or to disease of nerve roots, that it is difficult at times to properly estimate their significance. But a careful investigation with other associated symptoms will usually point to the seat of disease.

Pain is a symptom of uncertain value, and may be wholly subjective; but as a result of tumors in the neighborhood of the cord, without or within the canal, disease of bone or due to meningitis, it may materially assist in localization. It is usually severe in tumors and meningitis, is increased on movement, and follows the course of a nerve. It is sometimes present in a mild degree in myelitis, and may define the upper level of the disease. It is sharp and lancinating in tabes, or disease of the posterior roots; it is mild in ataxic paraplegia, in lateral sclerosis and syringo-myelia. Girdle pains encircling a belt of from one to four inches may assist in locating the segment involved, but its diagnostic value is overestimated, unless other and objective symptoms are present.

Incoördination, ataxia and spastic gait are frequently confounded or not properly differentiated. In tabes the symptom is the result of disease in the post-median column, a sensory lesion, and is probably due to an interruption of the reflex arc or fibres carrying impressions into the cord, while in lateral sclerosis the diseased tracts are motor in function, and the outgoing impulses from the cord are interrupted. In both diseases a spastic gait is prominent, yet due to a separate and distinct system degeneration. One, the posterior form, is associated with marked disturbances of sensation,

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while in the other, the lateral, no sensory symptoms are present.

The reflexes are an important aid in differentiating cord diseases. Knee, ankle, wrist, elbow and jaw jerk represent the deeper reflex phenomena. The plantar, epigastric, cremasteric, abdominal, eye and palmar, represent the superficial types. The first three only are found in health. In cord disease, if the knee jerk is lost, it indicates a lesion of the posterior column or roots, as in tabes, or a disease of the anterior horns, as in poliomyelitis. This is a simple proposition, and can be readily understood if we remember that the sensory nerves going into the posterior roots are indirectly connected with the anterior cell groups, which send the outgoing impulses. The reflexes are exaggerated in those diseases which are progressively degenerative, and which involve the outgoing fibres after they have left the anterior gray cells, as in lateral sclerosis. In this disease the fibres are undergoing irritation, pressure or degeneration. In the first two conditions the knee and ankle jerk are excessively exaggerated, and may remain so until the entire tract has undergone degeneration. Contractures are found in poliomyelitis and late stages of amyotrophic and lateral sclerosis, myelitis and diseases of the spinal roots.

Trophic disturbances, most commonly found in cord disease, are atrophies, hypertrophies or dystrophies, although the last two conditions may arise from nerve disease independent or outside of the spinal cord. The disease of the joints, known as Charcot's joint, is occasionally found in advanced tabes. Among the tropho-neuroses which affect the skin we find herpes, pemphigus, pigmentations and bed sores. Grave nutritional disorders may and frequently do give rise to symptoms. I have seen a number of cases presenting typical symptoms of lateral sclerosis, but their subsequent recovery demonstrated the falsity of the diagnosis.

In the foregoing I have simply outlined typical and established diseases. You will readily see that in atypical cases these symptoms may vary in degree and kind, and be widely associated, and to attempt to explain all of their variations would require an exhaustive treatise on the subject. To save time, I have tabulated these symptoms; first, according to symptoms, and, second, according to disease:

PARALYSIS OF MOTION.

Poliomyelitis Anterior.
Transverse Myelitis.
Diffuse Myelitis (irregular).
Amyotrophic Lateral Sclerosis.
Syringo-Myelia (advanced).
Locomotor Ataxia (rare and advanced).

MUSCULAR ATROPHY.

Poliomyelitis Anterior.
Transverse Myelitis.
Diffuse Myelitis.
Syringo-Myelia.
Amyotrophic Lateral Sclerosis.

DISTURBANCES OF SENSATION.

Locomotor Ataxia (lancinating pains—delayed sensation—anæsthesia.
Transverse Myelitis (more or less complete below lesion).
Diffuse Myelitis (irregular).
Syringo-Myelia (pain and temperature sense).
Ataxic Paraplegia (impaired—mild pain).

REFLEXES.

Poliomyelitis Anterior (lost).
Locomotor Ataxia (lost).
Lateral Sclerosis (exaggerated).
Ataxic Paraplegia (exaggerated).
Myelitis (exaggerated in dorsal region—lumbar region lost).
Amyotrophic Lateral Sclerosis (exaggerated).

POLIOMYELITIS.

Paralysis of motion.
Atrophy of muscle.
Lost knee jerk.
Trophic disorders.
Reaction of degeneration.
No pain nor sensory disturbances.

TRANSVERSE MYELITIS.

Paralysis of motion below seat of lesion.
Atrophy of muscle.
Anæsthesia.
Reflexes (abolished if in lumbar—present if dorsal).
Hyperæsthesia or girdle.
Electrical responses changed.

DIFFUSE MYELITIS.

Weakness, heaviness and tire.
Disorders of sensation (irregular).
Disorders of motion (irregular).
Hyperæsthesia.
Electrical responses abnormal.

LATERAL SCLEROSIS.

Incoördination. Spastic gait.
Exaggerated knee and ankle jerk.
Rigidity.
Absence of pain, paralysis or sensory disturbances.

AMYOTROPHIC LATERAL SCLEROSIS.

Incoördination. Spastic gait.
Exaggerated reflexes.
Partial paralysis of motion.
Atrophy of muscle.
Fibrillary contractions.
Contractures.
No pain nor sensory disturbances.

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TABES.

Incoördination.
Abolished reflexes.
Lancinating pains (delayed sensation or anæsthesia).
Pupillary symptoms.
Trophic disorders (joint, skin, etc.).

ATAXIC PARAPLEGIA.

Incoördination.
Exaggerated reflexes.
Dull pain.
No paralysis of motion.
Atrophy of muscle or anæsthesia.

SYRINGO-MYELIA.

Pain and temperature sense impaired (one or both).
Atrophy of muscle.
Trophic disturbances.
Scoliosis.

SURGERY.

WILLIAM ASBURY HALL, M. D., Chairman.

THE DIAGNOSIS OF INTESTINAL OBSTRUCTION.

BY WILLIAM ASBURY HALL, M. D.

Minneapolis.

It has been rightfully said that "the symptoms of intestinal obstruction form one of the severest and most frightful conditions known to pathology." While in regard to the clinical symptoms we must distinguish the cases with a rapid, complete obstruction of the intestines from those in which the condition develops gradually, still we must face the fact that a very large proportion of the cases of intestinal obstruction, from whatever cause, naturally terminate fatally, and while recovery may occur even after the severest symptoms, such recovery is exceedingly rare and never to be expected.

In no other condition is an early diagnosis so indispensable to successful treatment. In no other condition is so little to be hoped for in the way of treatment other than what is strictly surgical. The physician who, in these days, fails to diagnose intestinal obstruction when present, and allows his patient to die without an attempt having been made to restore the permeability of the canal by surgical means, is guilty of criminal incompetency, negligence and manslaughter. The symptoms and course of intestinal obstruction depend entirely upon the anatomical cause. These causes produce their effects in an entirely mechanical manner. These causes may exert their effects entirely from without the intestinal canal or entirely from within the intestinal canal. These causes may be due to changes in the intestinal wall itself. which may or may not be congenital. Of the causes operating from without the intestinal canal may be mentioned compression of the intestine from tumors of the uterus, ovaries or omentum, pelvic abscesses. appendicitis, plastic exudation about the uterus and hernia.

Of the causes that operate from within the intestinal canal may be mentioned the impaction of some portion of the intestine with fæces, gall stones, intestinal calculi or some foreign body that has been swallowed. Of the changes in the intestinal wall itself which may lead to obstruction may be mentioned cancer of the intestine or cicatricial contraction due to ulceration or syphilis.

The congenital lesions producing obstruction may be atresia of any portion of the canal or the incomplete development of the same. And lastly, obstruction may be produced by a twisting of a portion of the intestine about its mesenteric axis or the invagination of a portion of the intestine into the lumen of another portion of the same lying next below. The causes of intestinal obstruction are multitudinous, and it is this fact that makes the differential diagnosis so difficult. In reviewing these various causes it will readily be seen how, in some cases, the symptoms will make their appearance slowly, and how in others their appearance will be rapid and severe.

All cases of intestinal obstruction, from whatever cause, whether acute or chronic, have symptoms in common. These symptoms vary in the order of their appearance and in degree of severity according to their cause, and it is only by a careful analysis of these symptoms as regards the order of their appearance and severity that we are able to arrive at anything like a differential diagnosis.

Certain facts, gained from observation, in regard to the age and sex, oftimes give valuable aid in diagnosis. The history of the case is also of the utmost importance in diagnosing cases of chronic obstruction, which are frequently not recognized until the symptoms of acute obstruction have set in.

There are five common symptoms of acute intestinal obstruction: First and foremost is sudden *pain*, either intermittent or constant. Second, *vomiting*, early, severe and becoming fæculent. Third, *constipation*. Fourth, *abdominal distention*. Fifth, *shock*.

Let us now review the common symptoms in the light of experience. The pain in all forms of intestinal obstruction is usually located about the navel, though not always. The seat of pain indi-

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cates nothing whatever as to the location of the obstruction. The character of the pain indicates whether the obstruction is partial or complete. If it be intermittent it shows that the obstruction is partial. If the pain be constant, with exacerbation, it indicates complete closure of the intestinal canal. Thus, the cases of obstruction due to changes in the intestinal canal itself, viz: cancer and cicatrization, and 90 per cent. of the cases of acute intussusception are attended with pain coming on slowly and of the intermittent type. On the contrary, the cases of obstruction due to hernia, strangulation by bands of inflammatory exudate, volvulus, and 10 per cent. of the cases of intussusception are attended by pain that is early and constant, with severe exacerbations. These are practically all the deductions that can be drawn from the symptoms of pain in the differential diagnosis of intestinal obstruction.

The symptom of *vomiting* is confined almost exclusively to the cases of acute obstruction, and fæculent vomiting is exceedingly rare unless the obstruction be absolute. Early, severe and fæculent vomiting indicates *strangulation of the intestine*, and points to strangulated hernia. The vomiting in *volvulus* is less early, less severe, and in many cases apparently gives the patient relief from pain and other distressing symptoms, while the vomiting in *intussusception* is still less early, still less severe, and only becomes fæculent in less than 25 per cent. of the cases, which is due to the fact that complete obstruction very rarely exists in uncomplicated intussusception.

The next symptom, *constipation*, varies greatly in degree in the different forms of obstruction. In the chronic forms it frequently alternates with diarrhœa, and, when so, and the stools contain blood, indicates cancer. In acute intussusception it is also very rare that complete constipation exists; in fact diarrhœa is quite common, and in about 90 per cent. of the cases the stools contain blood.

The sudden onset of the pain in intussusception, with the negative history, is usually sufficient to make a differential diagnosis between these two conditions. Strangulation of the intestine and volvulus, however, produce immediate, absolute and continuous constipation and no blood.

Abdominal distention, to a greater or less degree, makes its appearance in nearly all cases of intestinal obstruction at sometime during its course. It is later in its appearance, unless from peritonitis, in all forms save one, that of volvulus, in which it is always early, rapidly increasing, and extreme. The greatly distended abdomen, with its irregular outlines and entire absence of symmetry, indicates volvulus, and is a picture never to be forgotten by anyone who has seen it.

The last common symptom, that of *shock*, is always present in all forms of acute obstruction. The weak and rapid pulse, the cool extremities, the usually subnormal temperature, the sunken and anxious expression of the face, the rapidly developing collapse, all indicate the gravity of the condition, and are out of all proportion to the other symptoms attending the cases. No differential diagnosis can be based upon this symptom, and the only deduction to be drawn from it is that the earlier and more severe it is in developing the more complete is the obstruction.

Statistical information regarding the relative frequency with which the different conditions present themselves at different ages and in the different sexes, are perhaps of some use in making a diagnosis, but are apt to be confusing. Thus the cases of volvulus occurring in males and in females are as 4-1, and the large majority of such cases occur between the ages of forty and sixty, while in acute intussusception over 50 per cent. of the cases occur under ten years of age. The most common form of intestinal obstruction is that of fæcal impaction, is confined entirely to adult life, and is more common in females than males. Lunatics and hypochondriacs are very subject to obstructions of this character. A common and distinctive symptom is the presence of a tumor, which is sometimes movable and can be changed in shape by pressure. Very little abdominal tenderness and no tenesmus accompanies this condition, which is in marked contrast to the tenesmus and tenderness accompanying intussusception. The presence of tumor also accompanies intussusception in over 50 per cent. of the cases, and can sometimes be felt in the rectum. Malignant disease producing obstruction may also manifest itself by the presence of a tumor, but volvulus and strangulation are never so accompanied. One fact of great diagnostic importance which must not be lost sight of is, that in obstruction of the small intestine, the contents of the intestine above the obstruction undergo decomposition with the consequent formation of large quantities of indol and phenol which is absorbed and voided in the urine, and which is easily discovered by means of the indican test which is readily applied. The test consists in the mixing of equal parts of urine and officinal hydrochloric acid in a test tube, and then adding, drop by drop, a concentrated solution of chloride of lime and shaking thoroughly after each drop, when, if indican be present, a decided indigo blue color makes its appearance.

I am aware that I have laid myself open to the charge of being somewhat didactic in this brief summary of the distinguishing features of some of the more ordinary forms of intestinal obstruction. I am also aware that I have advanced nothing new in diagnosis. When I chose this topic as the subject of my paper, I intended it should cover not only the diagnosis but the results of treatment in over one hundred cases which I have treated or seen in consultation, but I feel that I should be doing the Society an injustice in taking up so much

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time when it has so many others to hear from, and will desist. These cases have covered a period of over twenty years, and as I now look back I cannot but feel that many of my earlier cases might have been saved had I known then what I have since learned in regard to opening the abdomen and making intestinal anastomosis.

Some of these cases have been quite unique. For example: A case upon which I operated one year ago was very instructive. A young man giving a history of an indefinite bowel trouble for three or four years, had for six months previously been losing weight and strength until he was confined to the bed the greater part of the time. He had had nothing but watery stools for one year. Had very little pain, no vomiting and no abdominal distention. Upon opening the abdomen we found that the small intestine terminated in an old abscess cavity holding about one-half pint, and that the exit from this cavity was through a sinus four or five inches long, opening into the rectum about two inches from the internal sphincter muscle. The colon was completely collapsed and evidently nothing had passed through it in a very long time. An anastomosis was made between the small intestine and the colon with a Murphy button, but the man died. As to the results of treatment in these cases we can predict but little, for what we are apt to consider favorable cases will sometimes die, while on the other hand cases that we may operate which are apparently hopeless will recover. I operated a case of volvulus four weeks ago occurring in a man 69 years old, which had existed four days, and he was apparently *in extremis*. The colon was dilated to a diameter of nearly eight inches. It was incised and the gas allowed to escape, the twist was taken out of it, the incision in the colon stitched together, the abdomen was closed, and today the man is well and walking about the streets of this city. And so I wish to emphasize what I said in opening this paper, that any physician who allows a patient to die without making an attempt to restore the permeability of the intestinal canal, no matter how apparently hopeless the case, should be subjected to the severest censure.

TRAUMATISMS OF THE ABDOMINAL VISCERA.

By W. H. Magie, M. D.

Duluth.

In presenting this paper to the Society it will be my purpose to deal with traumatisims of the abdominal viscera other than those affecting the gastro-intestinal canal. The subject of compound traumatisims of the abdominal viscera—I mean by this, injuries of the abdominal organs in which the wounded organ communicates with an external or perforating wound of the abdominal parieties—is one about which a great deal has been written in the past. This, however, is not the case in injuries of the abdominal viscera, especially those of the liver and spleen, in which there are no external wounds of the surface to guide us in our diagnosis or treatment of these cases. This class of cases comprises a large majority of all cases of traumatism affecting the abdominal organs, and consequently should demand our most earnest and patient thought before deciding upon any plan of treatment, so that when we do finally decide, that our decision will be in the very best interests of the patient and the glorification of the science and art of surgery.

All injuries of the abdominal organs are more or less dangerous to the life of the person injured. The danger, of course, is in proportion to the amount of injury received and the organ injured. I am of the opinion, judging from my experience in quite a large number of cases, that the organ most commonly injured is the liver; that is, in cases where there is no penetrating wound of the abdominal wall, such as stab or gun-shot wounds. This may be due to the fact that my experience in this class of injuries has been chiefly with persons who have received their injury by falling from considerable heights, or being crushed between cars while making couplings, or by logs rolling over them while employed in the lumber woods. Any violence applied over the liver may, if of sufficient force, cause a serious injury of this organ. The degree of injury depends upon the amount of force applied and the manner of instrument with which the application of force is made. For instance, a piece of board or slab flying from a rapidly revolving saw and striking endwise over the liver would be very apt to cause rupture, where, if it had struck upon the flat of the board, the violence would be distributed over a larger area, and serious injury would not be so apt to have resulted. This principle applies in all cases, whether the injuries are produced from blows, flying timbers, rocks or other missiles, or from falls upon hard and uneven surfaces.

The diagnoses of injuries to the liver are not always easy, as all can testify who have had experience with this class of cases. However, when a patient presents himself, with history of injury in this locality, accompanied by shock, as indicated by rapid pulse, pallor of countenance, cold extremities and vomiting, with pain and tenderness in the region of the organ, you can rest assured that some serious injury has been done the liver or some of its appendages. Even in cases of doubt it is better to err on the side of safety and proceed at once to make operation by laparotomy. Although we are frequently inclined to temporize

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and delay in such cases, waiting for reaction or signs of future peritonitis, my advice is, act at once; you cannot afford to lose much time. These cases are serious and demand active interference at once, or they die soon of hemorrhage or peritonitis. Do not wait for reaction, as it may never occur. Why? Because, probably, you have a rupture of the liver to deal with, and the symptoms so often attributed to shock are those of the hemorrhage that is constantly going on and cannot be checked except by operation.

Prepare patient at once for operation by laparotomy after locating the wound in the liver, ligate all bleeding vessels, stop oozing by packing rupture or stitching the wound in the liver. After cleaning the abdominal cavity of all blood with mops or sponges, or flushing with normal salt solution, drain with gauze through the abdominal wound. The gauze packing is usually sufficient to control all ordinary hemorrhage and can be removed the same as any other packing after all danger of hemorrhage has passed. Liver wounds treated in this way, under proper antiseptic precautions, no matter how received, will prevent many deaths that would otherwise have occurred if we should wait for reaction or peritonitis before operating.

Ruptures of the gall-bladder should be treated by suture, provided the laceration is small. On he other hand, if it is large and ragged, we have a very efficient means, thanks to Dr. J. B. Murphy, in the anastomosis button, by which the gall-bladder can be united with the duodenum. The suture used should be the Lembert suture.

Rupture of the spleen occurs occasionally, but with not as great frequency as rupture of the liver. This is probably on account of its lesser size and greater protection, as it lies in its normal state entirely under the ribs. Rupture of this organ can be treated in the same manner as rupture of the liver.

Rupture of the urinary bladder is quite a common accident, and may be produced by penetrating wounds of the abdominal walls, such as gunshot wounds or stabs. It is also quite frequently penetrated through the perineum. This latter accident is usually produced by falling upon sharp, projecting sticks. I was consulting surgeon in a case of this character. A boy of eight years playing with his comrades by jumping from a bank into a snow-drift, struck upon the sharp end of a piece of shrubbery; the stick penetrating the perineum, entered the bladder. The case was not recognized as a penetrating wound of the bladder until too late. The child was in a dying condition when I was called, death occurring later from peritonitis. Another case in which the bladder was penetrated by the brake-handle to a wagon passing through the perineum. The man in this case was driving an express wagon at night and ran over some obstruction in the street, throwing him into the air, and in his descent alighting upon the upright end of the brake hand-piece, which passed entirely through both walls of the bladder.

The bladder is sometimes penetrated by fragments of bone, as in fracture of the pubic bone. Punctures of this character are usually extraperitoneal, as the bladder is free of peritoneal covering over a large portion of its anterior surface. The bladder is frequently ruptured by squeezing or from blows over the pubic bones. This accident usually occurs when the viscus is distended with urine, and the rupture is usually, if not always, into the abdominal cavity. This accident is most commonly caused in our community by being caught between the cars while making couplings, or by logs rolling over the body while the bladder is distended with urine. This latter cause is quite a common one in Minnesota, as the lumber business is carried on on a very large scale in this state, employing great numbers of men in the woods during the winter months.

Ruptures sometimes occur through that portion of the bladder wall uncovered by the peritoneum posteriorly and above or near the prostate gland. This rupture is very uncommon, and is usually produced by falling from a height while the bladder is distended, or by punctured wounds of the perineum.

Subperitoneal ruptures of the bladder wall sometimes occur. This form of injury is rare, however, and when it does occur it is very deceiving to the examining surgeon. These cases give more or less of the ordinary signs of rupture into the abdominal cavity, excepting signs of shock. This condition is not apt to be present to any great degree, because the urine is not free in the abdominal cavity, but is subperitoneal, and upon abdominal section may present the appearance of hæmatocele or distended bladder. This appearance is produced by the urine forcing its way beneath the peritoneum and dissecting it off from the bladder wall. This is not usual, however, and frequently the most patient search would be necessary to locate the injury to the bladder wall.

The diagnosis of rupture of the urinary bladder is quite easy, especially if it ruptures into the abdominal cavity. If the case is seen early the patient will present symptoms of shock, and upon passing a catheter no urine, or a small quantity of bloody urine, will be passed. If, however, you will inject into the ruptured bladder eight or ten measured ounces of boracic acid solution the injected fluid will escape into the abdominal cavity, as will be made evident by its failure to pass out through the catheter. If the bladder is intact it can be detected after injection arising above the pubis. In all ordinary cases these tests are sufficient and can be relied upon. However, they are not infallible, as certain tears, owing to their small character and possibly valvular nature, may prevent the free escape of fluids into the abdominal

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cavity. This is also the case in ruptures that are extraperitoneal. Fluid escaping into the cellular structures that surround the neck and that portion of the bladder that is not covered by peritoneum are slow to make their appearance at the surface so that they can be detected, and consequently this test will be of little value in ruptures of the bladder limited to that portion of the bladder wall that is outside of the peritoneal cavity and not compound. This class of cases, as I have said before, are usually the result of fractures of the pelvic bones, and taken in connection with the diagnosis of fracture of the pubic bones, the diagnosis should be made with considerable certainty. Penetrating wounds of the bladder through the perineum are easy of diagnosis as a rule, owing to the escape of urine through the perineal wound. Frequently the finger can be passed through the wound into the bladder. The injection method can be used with advantage in injuries of this nature.

Diagnosis of rupture of the bladder being established, then comes the question of treatment. All ruptures extending into the abdominal cavity should be treated by laparotomy and suture, in such cases as are not too extensive, or the edges of the wound too badly lacerated. The suture used should be the Lembert suture, including the serous coat and part of the muscular, being careful not to include the mucous membrane. Silk is the best suture material, and the sutures should be placed not more than one-fourth of an inch apart, and to extend one-half or three-fourths of an inch beyond the tear. After suture the bladder should be injected with a solution of boracic acid before closing the abdominal wound, to test it to see if it leaks. About six ounces of fluid is sufficient. If it should leak additional sutures should be added to make it tight. Catheterization should be resorted to every fourth hour. Drainage through the urethra or perineum is harmful.

Ruptures that from their ragged and extensive nature cannot be safely sutured should be treated by suturing to the abdominal wound, and drainage by tubes and gauze. The abdominal cavity should be thoroughly flushed with sterile normal salt solution, and all urine and clots removed and drained with gauze drain. This drain, of course, is entirely outside of the cavity of the bladder. The ordinary rubber drainage tube sterilized by boiling is what I have used, and answers the purpose very well. I usually put two tubes into the bladder and surround them with gauze, bringing both out through the abdominal wound. The bladder can be washed out daily through the tubes with boracic acid solution, five per cent. If treated early in this way the majority of the cases will recover.

Rupture through the anterior wall of the bladder in that portion unprotected by the peritoneum should be treated by suprapubic operation, and bladder sutured in suitable cases. The cases that are complicated by severe laceration or cellulitis should be drained in the same manner that we drain after suprapubic operation for stone.

The treatment by drainage, I am of the opinion, is the one that should be adopted in every case where rupture occurs in this portion of the bladder, as suppuration will surely occur where the urine has permeated the tissues for any length of time, and as the wounds are entirely extraperitoneal, it is the safest plan.

In closing this paper I would urge the importance of early diagnosis as well as early operative interference in all cases of injuries to the abdominal organs, sincerely believing that many lives are lost by timorously waiting while in doubt, that might have been saved had we been more bold at the start.

FOREIGN BODIES IN THE TRACHEA AND ŒSOPHAGUS.

By C. H. Mayo, M. D.

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I speak of these under the same heading, because of their intimate structural relations, which often complicate the early diagnosis of location, or the remote results of secondary changes. The difficulties in the diagnosis and treatment, with the attending responsibility, render these cases very serious to physicians and all concerned. The foreign bodies most frequently met with are seeds and articles of a vegetable nature capable of swelling, bones and metallic bodies.

In children it frequently happens that either the character or location of the offending body is a matter of conjecture, and the symptoms may be so slight as to mislead the physician, and, at a later period, a dislodgment of the irritant may possibly produce a fatal laryngeal spasm in the one case or ulceration of the œsophagus in the other.

A foreign body high in the œsophagus may, through local change and swelling, simulate a foreign body in the trachea, or a tracheal body by lodgment and temporary amelioration of the symptoms lead to the belief that a passing œsophageal obstruction is the cause of the trouble; therefore where the character and location of the foreign body is unknown it is well to pass the œsophageal bougie to make a differential diagnosis.

Foreign bodies in the trachea. Foreign bodies which have entered the air passages may lodge at any point between the larynx and smaller bronchi. The symptoms of foreign bodies in the trachea vary with their size, shape and location, and may

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be intense or extremely mild. The early symptoms are spasm of the larynx, choking, cough and respiratory distress. Vomiting may occur, and usually more or less shock. Bloody mucus may be raised immediately, and fatal dyspnœa often speedily follows from the laryngeal spasm, or the large size of the foreign body may almost completely occlude the trachea, as in Case 1.

Violent efforts on the part of the patient may sometimes dislodge and expel the irritant, but more often serve only to add to the distress and exhaustion. If the foreign body becomes fixed the symptoms tend to subside, thereby leading attendants to believe the body has been expelled, until later change of the position causes a recurrence of the urgent symptoms, as in Case 2.

The diagnosis is often difficult in children, but the suddeness of the attack, absence of temperature and comparative relief of the patient between the attacks of dyspnœa, combined with the aid of auscultation and laryngoscopic examination, will assist us much in making a positive diagnosis.

The prognosis is exceedingly grave, and depends to a great extent upon how early the patient is subjected to treatment. The dangers are both from the immediate obstruction and the secondary septic complications, being more serious in the child than in the adult.

A foreign body in one of the bronchi, unless removed, will almost certainly destroy life either suddenly or by lung complications, such as bronchitis, septic pneumonia, gangrene, abscess or perforation of the neighboring structures.

We may properly divide these cases into two classes for treatment: First. Where the foreign body is known to have lodged in the trachea or bronchus, in which case there is no doubt of the necessity of operative interference. Second. Those cases in which a positive, early diagnosis is not possible and necessitates delay until physical signs and symptoms verify the probable diagnosis.

The diagnosis determining the operation should not be delayed, no matter how mild the symptoms. The method often advocated of shaking a child by the heels and pounding him on the back is unwise unless the physician is prepared to make immediate tracheotomy for the relief of spasm of the glottis. Foreign bodies located in the larynx or high in the trachea may be removed through the mouth by means of the laryngescope and proper instruments. These do not, as a rule, form the urgent cases, as the foreign body may remain high in the trachea for long periods without exciting dangerous symptoms. Tracheotomy is necessary for the removal of foreign bodies that have passed the glottis, whether lodged high or low. The high tracheotomy or division of the upper two tracheal rings may be preferred in children with short necks, while in ordinary cases the low tracheotomy or division of the second three tracheal rings will prove more advantageous.

The performance of tracheotomy with the Paquelin cautery or by the use of some mechanical device is out of place in this class of cases. The points to be emphasized in the performance of tracheotomy after exposing the trachea are: First. The insertion of tenaculum in the median line of trachea above the point of expected incision, with the traction upwards. Second. A stab puncture of the trachea and cutting upwards. Third. Avoidance of injury to the œsophagus by too deep an incision. Fourth. Retention of knife in tracheal incision until the opening is secured by other instruments.

Chloroform is preferred as an anæsthetic, since it relieves laryngeal spasm. Anæsthesia is not necessary in operating during a suffocative attack. The use of a probe to loosen a foreign body or excite cough as in Case 1, reported, may prove of advantage as well as posture of patient.

If the foreign body is removed the wound will require little care. Our rule is to pack the wound lightly with iodoform gauze. If unable to remove the annoying agent, as frequently occurs, the sides of the trachea may be stitched to the skin and the opening maintained for a day or two. The irritant will be ejected usually within a few hours.

From a considerable experience in the removal of foreign bodies from the trachea I have selected three illustrative cases for the purpose of eliciting discussion.

Case 1. C. F. Age 6, M. After wearing an O'Dwyer intubation tube No. 3 six days for the relief of so-called membranous croup, the swelling left the larynx, allowing the tube to pass between the vocal cords, where it lodged in the upper part of the trachea. Upon attempting to remove it through the mouth it slipped down into the bronchus, producing a severe attack of dyspnœa. Respiration completely ceased in about fifteen minutes, and just before the incision of a low tracheotomy was made. The trachea was held open by forceps, the child held up by the heels and a probe inserted into the right bronchus, where it loosened the tube and excited spasmodic cough, aiding its dislodgment, and the tube slipped into the trachea and was withdrawn through the tracheal wound. Artificial respiration was maintained about twenty minutes. When it became natural a tracheotomy tube was inserted and remained six days. Recovery was perfect, although delayed by a septic bronchitis.

Case 2. C. C. Age 2, F. This child, while playing with citron seeds, had an attack of suffocation which was so severe her parents thought her dead. She soon recovered, however, only to have slightly less severe attacks at intervals. After three days the child was brought to St. Mary's Hospital, where, from the history and symptoms present, a diagnosis of foreign body, probably citron seed, loose in the trachea, was made. A low tracheotomy enabled me to dislodge a swollen

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citron seed, which was removed with forceps. The recovery was uneventful.

Case 3. M. M. Age 1½, M., was brought to me with this history: Three days previous, while playing in the yard, he was seized with a severe spell of suffocation. There had been nothing about him to indicate the cause of the attack, which had been followed by many more. A diagnosis of foreign body in the trachea of unknown character was made. A low trachectomy was performed, and a swollen kernel of corn was coughed up into the opening, where it was fixed by a curved probe and removed with forceps.

Foreign bodies in the œsophagus. While foreign bodies in the œsophagus are not primarily so dangerous as in the trachea, the remote results are very serious, and the foreign bodies themselves are as varied, with a predominance of artificial dentures, coins, bones, the larger fruit stones and temporary obstruction from food bolus. The impaction of the foreign body in the œsophagus generally takes place at its narrowest portion at the level of the cricoid cartilage, and next in frequency at the cardiac end, but may occur at any point. The symptoms depend upon the size and shape of the foreign body. If large and smooth, sudden death may occur from pressure upon the aperture of the larynx or from spasm of the glottis. If pointed and irregular there will be dysphagia or complete obstruction. Dyspnœa and a constant discharge of saliva and mucus with tenderness of the neck and soreness behind the sternum may occur. If left to itself the foreign body excites inflammation, which often leads to its dislodgment, but more frequently complicates matters by extending into the neighboring tissues causing perforation into the pleura, trachea, mediastinum or aorta. When the foreign body is large the diagnosis is comparatively simple. The exploring finger can reach as far as the arytenoid cartilages. When situated below this point its presence must be decided by inference, aided by œsophageal sounds, stomach tube, etc. Always bear in mind that symptoms of the presence of a foreign body in the œsophagus may be simulated by irritation of its mucous membrane, caused by its passage into the stomach, the sensation existing long after its dislodgment. When it can be done safely the foreign body may be extracted through the mouth. If unable to remove in this manner and it can be easily pushed down into the stomach this may be done. Neither method availing without the use of undue violence, an external œsophagotomy should be performed and the body extracted through the opening. Sometimes during the manipulations of removal the foreign body is ejected by the severe vomiting and retching produced, but emetics should not be given for this purpose, as the œsophagus has been known to be ruptured by violent vomiting.

Various instruments have been employed to dislodge the obstruction, such as expanding sponge probang, long forceps, blunt hook or coin catcher and soft rubber stomach tube. In cases of obstruction by bodies of an irregular character the swallowing of a knotted skein of thread fastened to a strong cord will often entangle the foreign body in its meshes upon its withdrawal. An external œsophagotomy is much safer than violent efforts at extraction or forced attempts to push it downwards. Operation should be made not later than twenty-four hours after diagnosis of impacted foreign body, other attempts at removal having failed. The operation of external œsophagotomy is usually made on the left side of the neck; carefully separating the tissues between the great vessels and trachea and avoiding the inferior laryngeal nerve, the œsophagus is forced into the wound by a urethral sound passed through the mouth, and its opening readily effected. If necessary, a finger can be introduced through the opening for the purpose of exploration, as in Case 2.

In case of impaction low down in the œsophagus a gastrotomy may be combined with an external œsophagotomy and the body loosened from below. If necessary the hand may be inserted into the stomach to effect its dislodgment, as recommended by Richardson, or gastrotomy will admit a probe passed from below, by the obstruction through the opening of the œsophagus, carrying a string with sponge attached, which, upon its withdrawal, may raise the obstruction sufficiently for its removal; the latter being similar to the Abbe string method of dividing strictures of the œsophagus. The wound is treated by a light iodoform gauze pack which serves the purpose of drainage and prevents discharge during the process of deglutition. The healing is by granulation, immediate suture not being safe.

In closing, I will report a case illustrating the three ordinary methods of removing foreign bodies from the œsophagus.

Case 1. E. L. Age 65, M., entered St. Mary's Hospital to be relieved of the major part of the breast bone of a chicken impacted in his œsophagus for six days. He was in bad condition, due to repeated attempts to force the body downward. It was lodged opposite the cricoid cartilage, and was removed after fracture of one wing by forceps, using the finger as a guide.

Case 2. W. C. K. Age 35, M., came to the office with a portion of an oyster shell caught in his œsophagus. The obstruction was only of a few hours' duration, but the patient was suffering severely. The obstruction was readily passed into the stomach by the safe pressure produced by the soft rubber tube.

Case 3. C. A. Age 3, F., was brought to St. Mary's Hospital with complete obstruction of the œsophagus, produced by an impacted prune stone. The œsophageal sound located the stone at the

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middle of the œsophagus. All attempts to remove through the mouth with forceps and hooks having failed, a low external œsophagotomy enabled us to get at the foreign body, which was situated three inches below the opening, and remove it. Recovery was uneventful, the wound granulating in about two weeks. The successful treatment of three cases of cicatricial strictures of the œsophagus by external œsophagotomy combined with gastrotomy, the passing of probes and the use of string dilators, has demonstrated the advantage of this method in giving access to all parts of the lower œsophagus.

HYSTERECTOMY.

By J. H. Dunn, M. D.

Minneapolis.

Extirpation of the uterus has been practised less or more since early in our century. The remarkable vicissitudes of the operation, whether with respect to the methods employed, the result obtained, the indications upon which it has been advised, or the alternate temerity or rashness with which it has been prescribed, are not without interest and instruction. They well illustrate the long and devious path of the explorers in search of clinical truth. Begun through the vaginal route by Langenbeck, in 1813, for carcinoma in a prolapsed uterus, little progress was made until reinforced by an assault from the abdominal direction in 1837 by Granville, acting upon a mistaken diagnosis; but soon followed by Burnham and Kimball, of Lowell, with abdominal hysterectomy as a definite procedure against certain fibroids. Of late it has been applied widely, and perhaps with parvenue enthusiasm, to the treatment of great classes of pelvic infections and phlegmasiæ, after the teaching of the French school, not to mention minor and occasional indications, such as prolapse, etc., insomuch that hysterectomy might fairly appear to some future reader of the history of the past ten years as something of a panacea for the chief gynæcological ills of our time. In the reaction which meets all practices becoming luxuriantly vulgar, more pains is likely to be spent, in the future, in teaching the limitations than the extensions of this operation. Having set the whole surgical and gynæcological world to successfully removing uteri, the post-graduate teacher may in the future find time to give more attention to curing patients, with and without hysterectomy.

It was not till after 1870, when Pean, following Koerberle, elaborated an abdominal method, that hysterectomy attracted much general attention. Indeed, not until 1880, when the great mortality of Freund's operation (total abdominal hysterectomy) turned the attention of Czerney to the nearly forgotten vaginal route, was the operation in a way to fall into the hands of the faddists. Procedures with a mortality of some sixty-five per cent.* discourage even these audacious people. It is only since 1880, and particularly since 1890, that the technique of hysterectomy has reached a wonderful perfection, and the direct mortality has been reduced to such a comparative trifle that it has doubtless in some measure suffered the fate of all comparatively safe operations, i. e., fallen into the hands of the masses, who operate, if not well, at least better than they reason and diagnosticate—men who always operate with more or less success upon the patient, but rarely against the disease. Most of us have seen extirpation of the uterus evolved from a rare operation with an appalling mortality to one of daily occurrence with a decidedly moderate fatality. The perfection to which the modern operative technique of extirpating the uterus by vaginal, by abdominal, or by combined methods has been brought is most strikingly realized by observing the work of such surgical artists as Howard Kelly and a host of others in various quarters of the globe. Such grace, elegance and despatch delights the spectator, and must largely reconcile any female to the loss even of so important a part of her anatomy. Numbers of the greater army of less brilliant but almost equally capable surgeons are at least creditably executing these operations in every part of the country. Perhaps most of us can remove the uterus better than we can decide when and how to do or not to do it, can excise an organ better than we can remove disease and best treat a patient. A fearful notion has swept over the country that to excise something is *per se* a great and glorious thing, and that to operate is necessarily to be a surgeon. This is indeed a very puerile error. There is an old remark that certain physicians see many patients, but few diseases. I fear something similar might be said of recent surgery. Is not this in some measure the natural result of the great, almost exclusive attention given to operations *per se?* Have we not been largely passing through a kindergarten stage of surgery, in which the struggle has been to teach everybody, by pictures, diagrams and "gifts," the technique of hysterectomy and other "ectomies?" Without denying the necessity of this step in our evolution, I have felt such to be the case; and believing that the technique of extirpating the uterus under various circumstances has somewhat surpassed our knowledge of its rational application, I have ventured to present for discussion some crude outlines of the indications and contraindications for resection and extirpation of a womb.

There are three great enemies against which resort is sought in extirpation of the uterus. First, uterine malignant disease, chiefly carcinoma. Second, certain fibroids. Third, certain pelvic infections and their results. We are all painfully aware

*Pozzi quoted by Albert, Lehrbuch der Chirurgie.—Dritter Band, S. 487.

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of the frequency, apparently increasing, of cancer—next to tuberculosis easily the greatest destroyer of human life, and especially of its adult and mature portion. All of us a little past the period of operative fever and hyperenthusiasm know how rare are its cures.

I have not yet been able to trace a breast case three years free from return, though my first vaginal hysterectomy was well and free from recurrence after six years. Surgeons know that ninety-nine per cent. of the breast amputations of the past not only did not definitely cure, but could not have been expected to do so in the light of subsequent researches. First, because the diagnosis was not made before the disease was generalized; and, second, because the removal was not even locally complete. Men of experience must needs despair of the operative treatment of carcinoma were it not for the hope that a far earlier recognition and a far wider and more scientific removal of the yet local disease will yield a very different result. Now, every experienced surgeon must know that no small share of the blame rests upon certain of the profession. We find men observing a lump for months, waiting for adenopathy, cachexia and other ancient landmarks for a diagnosis, and then performing some set operation upon some organ, rather than promptly making a diagnosis and operating against the disease. With the extraordinary attention which womankind, aided by the average practitioner bestows upon her womb, it might seem that next to the lip the uterine location would be the most favorable for prompt discovery; while post mortem and clinical experiences show that uterine cancer is for the most part slow to generalize. Often the local destruction is astonishingly great before the iliac lymph glands become involved, and in many cases, after death distant metastases are less common than in malignant disease of other organs, particularly of the breast. I have never known the removal of even a labial epithelioma after the lymphatics were clearly involved to much stay the disease. In my limited observation, appropriate cases of uterine cancer have given much better results than corresponding breast cases. But if the best results are to follow, to early recognition must be added better operating. The mind must be bent less upon the operation of hysterectomy, and more upon extirpation of the carcinoma. All pathologists and surgeons are agreed that carcinoma of the cervix shows but little disposition to extend into the body of the organ, but invades the vaginal walls and the connective tissues; so that if only the uterus itself be closely enucleated, in many cases a high or supravaginal amputation is quite as effective and more conservative. I believe that in certain cases of pavement epitheliomata still well limited to the cervix, high amputation will again be preferred to hysterectomy. Not that it is a particularly safer operation, but because it does not unsex the patient without sufficient object. For the most part, however, when the disease is much advanced it is better to make the hysterectomy total: first, in order to take widely of vaginal and connective tissues into which the disease is prone to extend; second, for better palliative results in case of return, since it is not so much in the fundus uteri as in the vagina, broad ligament and pelvic glands that the enemy retreats—structures which may practically be inspected, commanded and removed only by the removal of the uterus, the whole broad ligament, a cuff of vagina, and also, in case they are found enlarged, the iliac glands, as advocated by Prof. Kelly, of Baltimore. Believing as I do that carcinoma, having once widely spread into the lymphatics, for the most part baffles complete surgical removal, I have attempted this operation but once, and, I regret to say, lost the patient by septic peritonitis on the fifth day. Nevertheless, if we are to attempt the surgical cure of any but the most incipient stages of uterine cancer, we must logically resort to this total abdominal ablation. And if for many of the incipient cases we turn to the less mutilating high amputation of the cervix, it clearly follows that but a moiety of the cases of uterine cancer now so often attacked by the old vaginal method will in the future be thus managed. First, a few clearly limited to the cervix will do as well by cervical amputation; second, more or less certain localization, but not too widely involving the connective tissues, are proper for vaginal excision; third, as soon as the vagina and broad ligament are much involved, the rectum and bladder being free, if operation be considered at all it ought clearly to be by cœliotomy, and should be directed to removing the disease rather than to executing some preconceived form of hysterectomy. As to vaginal hysterectomy for the other indications, though the attractions of cœliotomy for removing the fibroid uterus are undeniable, the technique reduced to great perfection, and most of us having gained more hard experience with this method than with the less attractive morcellation, yet certain undeniable advantages of the latter to the patient will gradually incline us to the vaginal route. The question of mortality is far too deep for present discussion; but I have no hesitation in believing that as a general proposition a skillful vaginal removal of the uterus is, all things being equal, less dangerous than an abdominal one. The confinement is, in general, much shorter and less disagreeable; there is no abdominal scar nor tendency to hernia. As our experience increases, particularly with the present tendency to greatly extend the surgical treatment of fibroids, and hence attack them before a great size is reached, it is pretty certain that the vaginal methods will be more and more extended to this large class of cases until recently so generally approached by cœliotomy.

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This method of treatment is mostly mentioned by authors with condemnation, and yet my experience shows that it is an entirely feasible, and perhaps as successful, a treatment as the operative methods. I use a silver Eustachian catheter 2.5 mm. in diameter, with 7 mm. of the beak bent at nearly a right angle. The beak is introduced into the ostium maxillare, and the antrum is profusely washed with a hot solution of soda bicarbonate and then with as strong a solution of carbolic acid as the patient can comfortably bear. The process is not very unpleasant, even without cocaine, and there is generally little or no discomfort afterwards. The relief has been uniform in my cases, the discharge becoming less profuse at once, and after a few days practically nil.

In primary acute inflammations of the sinus I employ general antiphlogistic medication and especially belladonna and potash bromide. Locally I use hot douching of the nares, cocaine, and, if necessary, limited applications of trichloracetic acid, to prevent or subdue swelling of the mucous membrane in the region of the ostium. Such cases are often aborted, and where the disease progresses to formation of pus, the usual tendency is to a speedy resolution, with only the simplest nasal treatment, or none at all. Where, however, from infection or otherwise, a chronic empyema becomes established, with more or less profuse fetid discharge, the disease must be attacked *in situ*, and I believe the plan I have outlined affords the simplest and most successful method of dealing with the great majority of such cases.

Rev. J. H. P. had suffered some months with a profuse and fetid discharge. As it persisted after reduction of the nasal obstruction, I proceeded to wash the antrum daily, and in about ten days the trouble disappeared.

N., 24 years old, had suffered from an empyema of the antrum six months or more. After some months of nasal treatment, which produced no result so far as the discharge was concerned, a few daily douchings of the antrum so far relieved the trouble that he stopped attendance and has since come in occasionally, when an acute cold has caused the reappearance of the pain or discharge. In both of these cases the head of the middle turbinate had been snared and polypoid masses removed from the infundibulum.

Dr. C. has had for years recurrent attacks of pain and discharge from the left antrum. He is too busy to give much time to treatment, but occasionally comes to have his antrum douched, and always with decided relief. An interesting feature of this case is a long continued spasmodic condition of the left orbicularis. This had been in a measure mitigated by correction of comp. hyperopic astigmatism. It was also relieved by cocainization of the left naris and removal of a posterior septum spur, but none of these things have given such decided relief as the douching of the antrum.

The objections to this method are two: first, that the ostium is not the most dependent part of the antrum, and, second, that the method is difficult. Neither objection has very much weight in comparison with the unpleasant circumstances attending the opening of the antrum *per orem*, whether through the alveolus or the canine fossa. The method advocated by Bosworth, Myles and others of opening through the inferior nasal fossa and leaving *in situ* a tube for douching and draining is a less formidable operation, but it involves the wearing of a tube in the nose and the possibility of infection through the use of unclean instruments or fluids by a careless patient, and I am not convinced that the results are as good as by the method I have described.

RADICAL CURE OF CRURAL HERNIA.

By Knut Hoegh, M. D.

Minneapolis.

While there may be difference of opinion whether inguinal ruptures that can be retained by trusses are legitimate objects for the radical cure, a question that lies outside of the scope of the present paper, there seems to be very cogent reasons for believing in the necessity of operating the great majority of crural hernia. In the first place, crural hernias are very dangerous to life, which is easily seen when we remember that more deaths occur from them than from the inguinal variety, although there are seven to eight times as many sufferers from these. This will not surprise us when we consider that the openings or the rings as well as the canals are different; the larger and more yielding ring and the straighter canal explain sufficiently the slighter danger of incarceration and strangulation connected with inguinal hernia; the opposite conditions in femoral hernia do not only invite strangulation, but lead very rapidly to gangrene of the bowel. Next to the dangers connected with it, the pain and discomfort will often drive the patient, who bravely faces an unknown danger that is not immediately threatening, to seek surgical relief. The cause of the pain is usually adhesions preventing free peristalic movement, thereby leading to colic or even attacks of peritonitis. A third reason for advising and performing the radical cure is the impossibility of retaining some of these ruptures by any kind of truss that can be tolerated by the patient. Finally, a great number of them are only partly reducible, for in this variety you will often find that either a slip of omentum or a loop of bowel is adherent to the sac or its neck. To wear a truss over such a projection is surely to invite disaster, and to go without one nearly as dangerous.

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My personal experience with these cases will certainly bear me out in the statement that the presence of a femoral hernia is much more dangerous than a proper operation in skilled hands, and I trust that every surgeon and every practitioner in the country districts is fully aware of the dangers threatening the subjects of this infirmity; and very many of you can undoubtedly affirm the innocuous character of the operation.

My standpoint in regard to these cases is therefore a firm one for the operation in all cases of crural hernia, except in persons suffering from other diseases that impair the vitality and make any operative interference a hazardous risk. I also except persons that are old. I cannot draw an exact time of age and say that the operation is unjustified, after say fifty years of age, because some persons retain their youthful ability of regeneration longer than others. I will only say that I should extend the age limit longer in the case of patients with crural hernia than in those with inguinal. Besides the reasons already given in favor of this operation, as compared with that for inguinal hernia, I will point to the average difference in size. For the usually smaller femoral (or crural) hernia exhibits less dangers in the operation than the usually larger inguinal variety; longer time is consumed with a large hernia; a greater surface is denuded, and more secretions will take place to interfere with the ideal beauty of the healing process.

The diagnosis of a femoral hernia may be difficult, particularly in fat individuals. Typical cases do not offer any obstacles to a proper diagnosis, if ordinary knowledge, care and patience are brought to bear upon the subject, but there are atypical cases that may baffle anybody. For instance, where there is a mere slip of the omentum that has wormed its way out through the crural canal and become adherent to some portion of the sac, as is not infrequently the case. All you feel, then, is a dough-like or pasty little lump, somewhat tender on pressure, perhaps, but not reducible, nor does it give an impulse on coughing, nor can you feel the opening of the crural canal. The history of the case and the exclusion of any other condition will, in such cases, often lead to an appreciation of the true character. In cases of uncertainty it is at all events safer to proceed as if the case was one of hernia; for to treat a hernia as if it were a case of lipoma, enlarged gland, or suppurating bubo would be a more serious mistake than to commit the opposite error. In the majority of cases patency of the ring, impulse on coughing, tympanitic sound on percussion will lead to an absolute certainty.

In comparing this form of hernia with the inguinal one, I have often been struck with the fact that it was found in persons of good muscular development who had not been engaged in particularly straining muscular efforts. I believe that this is not so in the acquired form of the inguinal hernia. Another feature that may be recollected is the fact that this hernia is not accompanied by important structures that may be wounded or otherwise injured during the operation, as the testicle and cord may be in operation for inguinal hernia. That there should be any danger to the crural vessels I cannot admit. They are well sheltered behind and outside the hernia, and would run no risk at the hands of an operator duly familiar with anatomy.

Another peculiarity of the crural hernia is its hour-glass shape or form; this is of great practical importance, because the constriction at the middle of the sac may be mistaken for its neck, and the operator may thus be let to perform an incomplete and therefore useless operation. A crural hernia has two distinct portions, one outside of the saphenous opening, and one inside of it. It is the first named that is apt to turn abruptly over the falciform edge and assume a direction upward and inward. The dissection of this portion is comparatively easy in many cases. The second portion of the hernia occupies the space between the saphenous opening and the inner ring of the crural canal, and lies, of course, much deeper, surrounded by large veins, which directly open into the saphenous or the femoral. Sometimes the sac of the distal portion of the hernia is very irregular, both in outline and in thickness, and its relations to the surrounding parts are often extremely difficult to make out by dissection. If there are adhesions of viscera to this portion of the sac there have been previous inflammations, and these have often united the sac and the surrounding connective tissue into one mass, to which even the omental slip may have become agglutinated. Then the sac may be infiltrated with fat so that the fibrous portion of it is exceedingly thin in some places, while it is dense and easily differentiated from the adipose and connective tissue in other parts. The operator may thus meet with serious difficulties even from the beginning, so that I should not advise everybody to undertake this operation, no matter how outspoken I am as an advocate for its necessity in proper cases. To overcome the difficulty just alluded to, I direct my dissection at once to the saphenous opening and proceed from this landmark, where you can always isolate the sac outwards.

The object of the operation for crural hernia and its various steps is the same as that for inguinal, and consists, briefly, in (1) isolation and drawing out of the sac; (2) opening of it to remove adhesions and put back viscera that must be reduced; (3) the removal of a greater or smaller portion of the omentum; (4) closure of the sac; and, finally, (5) the sutures. I shall consider these points in their order and give reasons for their necessity, where they do not seem self evident.

Some features of the isolation have already been

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alluded to. It remains only to draw attention to the necessity of making clean and bloodless dissections in working on the inner portion of the sac. Here it is necessary to tie or clamp every vessel before it is cut, and to dissect with the edge of the knife, and not tear with the fingers or with the handle of the instrument, whereby the true relations of the parts are obscured and finally lost. To carry the dissection far enough the crural canal must be incised, and this must be done directly upwards. If, by an unfortunate disposition of the epigastric artery this is cut, then nothing is safer than to prolong the opening and thereby be able to reach the bleeding point and tie it. It is advisable to dissect the neck out completely, for there are often adhesions just on its inside, and besides, the complete obliteration of the funnel-shaped opening of the sac, which below will be mentioned as the chief object of the operation, can only be obtained in this manner.

The second step in the operation to open the sac is not recognized by all operators as necessary, which is sufficiently proved by the various methods of disposing of the sac advocated by McEwen, Kocher, Banks, etc. The reason why it should always be performed in all radical cures is the possible presence of adhesions which otherwise may be overlooked. It is furthermore safer to be guided by vision than by the sense of touch, when the question is to replace a thin loop of intestine.

The third indication, consisting in the drawing out of omentum, is of great importance for several reasons. The first is that by removing a considerable portion of omentum more space is created in the abdomen, and consequently the intraäbdominal pressure, an undoubted factor in the production of a hernia, is materially diminished. The second is that omentum has a tendency to send out slips or projections like an amœba or a white corpuscle that tries to go through the stomata of a vessel. These projections insinuate themselves in any bulging process of the peritoneum. By their growth they gradually enlarge it, and thus pave the way for the descent of a bowel. When the sac is opened it is therefore my rule to introduce one or two fingers and hook down a portion of omentum. I use as much force as I think I can safely employ in getting down as large a part of it as possible. On one occasion I removed almost a pound. The stump is collected and tied very carefully by a Staffordshire knot or by knots in chains; never by a mass ligature, which may slip off in forcing the stump through the ring. The result of such an accident might be fatal hemorrhage. A final reason why omentum should be drawn down is that in this way unsuspected adhesions just inside of the abdomen may be discovered.

The fourth step consists in tying and cutting off the sac. To do this the sac must, of course, be freely dissected out, the finger must sweep the circumference of the inner ring, to be sure that this is really accomplished. Considerable force is used in drawing the sac down, and it is then tied by transfixion. After the stump is cut off, the proximal portion ought to draw itself out of sight, thus showing that the funnel shaped opening is totally obliterated and displaced from the place where the anatomical relations favor its further development. In this high cutting off of the sac and the consequent effacement of the yielding portion I see the chief security against a recurrence of the disease.

The final step of the operation is the suture. The ring is sewed, and so is the crural canal. In uniting the latter it must be remembered that the needle must not be directed from one side to another, for in this way the femoral vessels might, unfortunately, be punctured, but from above downwards, which is absolutely safe, and also has a tendency to bring the ligament of Poupart downwards towards Gimbernat's ligament. In suturing the wound of the subcutaneous tissue and the skin, it must always be remembered that there be left room for drainage. It is advisable always to drain. The dissection and the handling of the tissues lead to a certain secretion, which it is much safer to lead away than to trust to the powers of absorption. There may, of course, also be some hemorrhage after the patient recovers from the anæsthetic and the heart regains its tone. The drain should not go deeper than the deep layer of the superficial fascia, and should be let out through the upper end of the wound. The secretions find their way out just as easily with this disposition of the drain as where it is pointing downwards. The idea that the secretions thus have to work against gravitation depends upon a purely theoretical assumption devoid of any foundation in fact. The reason for selecting the upper end of the wound is that it in this manner is further removed from the sexual and urinary organs, which, particularly in the female, are extremely fertile sources of infection. The suture is carefully executed. Buried catgut sutures are employed for the deeper layers.

The operation does not call for any special instruments. An abundance of hemostatic forceps and needles are needed. For ligature of vessels, which I try to avoid as much as possible by temporary compression, and by torsion, I use catgut sterilized by dry heat. The same material is used for ligation of sac and for all buried sutures. I have found that prepared by Dr. Boeckmann, of St. Paul, reliable and useful in every way.

Outside of the wound I sprinkle a mixture of one part iodoform and four parts of tannin; this is covered by a layer of iodoform gauze. Outside of this is applied four bags moderately filled with an antiseptic absorbent powder.* In these bags

* The antiseptic powder that I use to fill the bags with consists of equal parts by weight of cinchona bark, iodoform, gr. benzoin, and magnesia carbonate impregnated with as much olei eucalypti as it will hold.

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the secretions are absorbed, sterilized and dried, thus enabling me to have the first dressing on for one week. Outside of these bags, that are retained by roller bandages of sterilized gauze, comes for further protection corrosive sublimate gauze. This is held in place by a very voluminous dressing of cotton, which produces by its elasticity an even pressure, and prevents slipping of bandages.

After one week the dressing is renewed and the drain removed.

One or two more dressings take place in the remainder of the time the patient has to remain in bed, in all three weeks. At the end of this time the patient is allowed to sit up.

When the scar seems entirely solid, in four to five weeks after the operation, a light belt provided with a hard pad is applied. This must not be confounded with a truss, as its object is entirely different, and its construction not less so. Its object is to support that part of the abdomen which is above the scar, so that the intestines be prevented from pressing down upon the yet yielding wound and sutures and not to block up the crural opening, which is the object of an ordinary truss. It is not provided with a spring. This bandage is worn six months. To wear a truss pressing upon the scar leads to atrophy of it, and is objectionable.

I have operated upon four cases in this manner, and have had uninterrupted recoveries. In three cases more than one year has elapsed since the operation; there is no recurrence, and the patients are free from their former pains.

I shall briefly relate the symptoms of the fourth case which I operated upon two months ago, to show the difficulty of diagnosis, and the necessity for the operation.

O. H., commercial traveler, 38, single, a strong man of good habits, a hard worker. In December, 1894, he was, when apparently in perfect health, taken with sudden pain, gradually increasing; it was felt over the whole abdomen, most in its lower parts. In character it resembled the gripings of a common bellyache; there was no vomiting; it was so intense that he had to get off the train, on which he was traveling, and go to bed in a hotel. After one day he was well enough to continue to travel; in a couple of days he had completely recovered. In May, 1895, he had a similar attack, but more severe; this time the pain lasted one week, was most pronounced in right side of abdomen. Competent physicians thought he had appendicitis. While he was out of bed in one week he had pain of a gradually diminishing character for four weeks. After this, complete recovery. In September of the same year he had another attack; a very able physician, whom I know as a careful examiner, recognized that he had peritonitis, but could not find the starting point of this inflammation; thought, however, that it was not appendicitis. This attack was the severest one he had had, and he did not regain his good digestion after it. There was always a feeling of oppression *in cardia;* he could not bear every kind of food; had a tendency to constipation. I saw him some time afterwards, and could not make out the nature of the attacks; his whole system was carefully examined and no tenderness or swelling was discovered anywhere, particular attention being paid to the region of gall bladder, McBurney's point in hypogastric region. Needless to say that lungs, heart, liver, spleen, rectum and urine were examined. The stomach contents were examined after a Leube's test breakfast, and the absence of muriatic acid and pepsin determined. The case might be interpreted in various ways, none of which seemed to offer any certainty of being the right one.

In March, 1896, he had a new attack. Led by my previous questions he now observed himself carefully, and was sure of the following conditions: The attack was not preceded by constipation; it started when in bed at 5 A. M.; were of a griping character, felt all over abdomen, mostly in its lower part, more on right side, perhaps. Two hours after the beginning of the attack he had a free movement of the bowels without relief. His bowels had been perfectly regular before the attack. After the attack he was constipated for four days, when he moved the bowels with a dose of Hunyadi Janos water. He had no pain after five days when he was quiet, but griping would return when he walked. I examined him April fifth, and found some tenderness below the navel and to the right; a certain fullness in the region of right Poupart's ligament was observed. The next day I discovered that the right inguinal canal was open, but contained no hernia; but below a line drawn from spina ilei to tuberculum pubes was found a soft, elastic swelling, size of a filbert; it was somewhat tender on pressure, immovable. The cribriform fossa was not detected by palpation.

It was supposed that the soft, elastic tumor was a hernia of omentum that had slipped through the crural canal. It had not been detected by me before, partly, at least, because the patient had been very fat, but had lost twenty-five pounds.

The diagnosis was reached partly by exclusion. Dr. Boeckmann, of St. Paul, and Dr. Albert Smith, of Minneapolis, concurred in the diagnosis, and advised operation.

By this the correctness of my assumption was proved. The omental slip had become adherent to the fundus of the sac outside of the saphenous opening; there was quite a little omentum in the crural canal, and adhesions to the neck of the sac. The operation was difficult on account of the adhesions and the proximity of the cæcum. A loop of thin intestines seemed to be on the point of descending into the crural canal, but was not contained in it. About one ounce and one-half of omentum was resected.

The patient made uninterrupted recovery.

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THE X-RAYS.

By Arthur Ayer Law, M. D.

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When on the eighth of November, 1895, in the little town of Würzburg, Bavaria, Dr. William Konrad Roentgen made the discovery that has since aroused the enthusiasm of the scientific world, he conferred as great a blessing upon humanity as did Sir Joseph Lister, Sir James Simpson or Dr. Morton.

It had been known for many years that the discharge of a high tension electrical current through a vacuum was productive of most brilliant and beautiful results. Prof. Crookes was the first to demonstrate this phenomenon and to devise tubes which are now known by his name. The Crookes' and Geissler's tubes are nothing more than glass tubes into which have been inserted two electrodes, either of platinum or aluminum, and exhausted of their air until a perfect or nearly perfect vacuum results, one millionth of an atmosphere remaining.

Until 1894, when Prof. Hertz studied the subject, the illumination of vacuum tubes was of no practical utility aside from the novelty and beauty of the experiment. Prof. Hertz, after an exhaustive study, found that upon the electrical excitation of a Crook's tube some kind of energy, which he called the "Cathode Rays," resulted and had the power of penetrating certain opaque substances, as instanced by an aluminum plate, if this plate was within the vacuum tube.

His assistant, Dr. Leonard, pursued his investigations still further and found what Hertz failed to find, viz: that certain invisible rays outside the tube, but emanating from it, had the wonderful power of penetrating substances opaque to the ordinary rays of light, as wood, some of the metals, paper, etc.; also that they acted upon a sensitized plate as did ordinary light.

Dr. Leonard failed to appreciate the full import of his discovery or to follow it up. It fell to the lot of Prof. William Konrad Roentgen to develop this discovery. Like most of the great discoveries which have startled the world, his was purely the result of an accident—an accident that gave him the hint which resulted in the report he gave to the world at the December meeting of the Würzburg Physico-Medical Society.

Prof. Roentgen claimed that he had discovered a new kind of rays, which he very aptly named the "X-rays," using the algebraic symbol for the unknown quantity as being expressive of what was really known of the physical properties of the rays.

His rays differed from the so-called "Cathode Rays" of Hertz and Leonard in that they could not be deflected by a magnet; neither could they be reflected nor refracted; again, they were immeasurably stronger in their ability to penetrate opaque substances and influence a sensitized plate.

In the modest report of his discovery Prof. Roentgen did not attempt to explain what the rays were; simply told how he had procured them from a Crook's tube excited by the disruptive discharges from a large Rhumkorff coil; showed photographs taken through the flesh and showing the bones of the hand, of various metals and woods penetrated by the rays.

His report of this discovery was received with the incredulity that is the heritage of every new and wonderful invention or discovery. Ere long, however, from the scientific centres of Europe came corroborative testimony substantiating in the fullest measure what Prof. Roentgen so modestly claimed.

Never in recent years have the scientific and medical worlds been so thoroughly aroused as by this discovery. It naturally appealed most to physicians, who saw in it a means of diagnosis that bid fair to put into retirement many of the objective and subjective methods of physical diagnosis now in use.

Following close upon the footsteps of the continental scientists, our own countrymen began to report their investigations. Prof. Arthur Wright, of Yale University, was one of the first gentlemen in this country to get results. Prof. Goodspeed and Dr. Cantrell, of the University of Pennsylvania, were pioneers in the work.

All the work so far in Europe and America had been done by means of the vacuum tube, excited by an induction coil. It fell to the honor of Dr. Wm. J. Morton, of New York, to take the first photograph by means of a tube excited by a Holtz machine.

Owing to the fact that the so-called static induced current discovered by Dr. Morton in 1881 and reported by him is practically identical with the induced current from a Rhumkorff coil, Dr. Morton conceived the idea of using this current from his large static machine. He coupled up his tube to the outer coatings of his smallest Leyden jars and regulated the interruptions by separating the rods. The doctor got better results with this method than by means of the induction coil and put the method within the reach of every physician who can command a Holtz machine and vacuum tube.

What work I have done with the X-rays has been done entirely as he taught me, by means of the static induced current.

What the rays are is a question that is agitating the experimenters, and a question as yet unanswered. Prof. Roentgen himself suggests that the rays are due to longitudinal vibrations in ether, in contradistinction to ordinary rays of light which are horizontal.

Nicholas Tesla holds that the rays are material particles derived from the metallic electrodes

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within the tubes and being thrown off penetrate the glass, whatever substance is interposed between them and the sensitized plate upon which they finally impinge and influence as do rays of light.

Some French observers believe the rays to be of the nature of light, that is, invisible or black light. Aside from the ordinary photographic application of the rays in taking the skiagraph, an instrument called the skiascope or cryptoscope was devised, at about the same time, by Prof. Magie, of Princeton, and Salvioni, of Italy. This consists of a tube darkened on the inside, into one end of which is inserted a sheet of sensitized or fluorescent paper—preferably barium platino-cyanide paper. With this instrument and an excited tube we are enabled to see what before could only be photographed; the rays penetrating the limb or subject interposed between the tube and the skiascope, and the shadow being thrown upon the sensitized paper renders it fluorescent in different degrees according to the density of the subjects used.

Of infinitely greater utility than the skiascope is a later instrument suggested by Mr. Edison. This is the so-called "fluorescope," differing from the "skiascope" in that it is much larger, has a mask fitting snugly to the face, and, instead of a tube, has for its body a hopper-shaped box into the large end of which is inserted a screen coated with calcium tungstate, which is much more sensitive to the X-rays than barium platino-cyanide, and is the substance chosen by Mr. Edison, after experimenting with 1,800 different ones, as being the best for the purpose. With this instrument it is a simple matter to see the bones of the face and the extremities, hands and feet, the ribs, the vertebral columns, and even the heart beating casts a dark shadow that can be seen distinctly.

In their application to medicine and surgery, as a means of diagnosis, the rays are of more immediate interest to us. We can readily determine the presence of many of the foreign bodies, whether imbedded in the flesh or bones, as instanced by bullets, needles, glass, pieces of metal and some of the calcareous deposits; the rays penetrating the flesh and, to a lesser extent, the bone; but being unable to penetrate the foreign body, the shadow of which is thrown upon a fluorescent screen or sensitized plate.

I have seen with the fluorescope and have taken photographs of needles, bullets, pieces of glass and metal underneath the bones, and in the tissues and joints of the hands, feet, arms and legs, the rays being thrown through the flesh and bones and showing perfectly the foreign bodies imbedded; indeed, in one case the eye of the needle is apparent after being photographed beneath the bones of the hand.

By means of the fluorescope I have been enabled to locate bullets imbedded in different localities in the body, from the toes to the abdomen, from the tips of the fingers to the shoulder, and even through the base of the neck. Indeed, I have seen a bullet through the thorax.

The callous resulting from a fracture, or indeed the fracture itself, is readily seen. I have taken photographs of both. The rays are particularly useful in diagnosing cases of obscure fracture, especially those where a joint is involved or where the swelling is so great as to preclude the possibility of a diagnosis by other means.

Some of the diseases of the bones are readily pictured, notably the rarified areas incidental to tubercular disease; exostoses and bony tumors are shown readily, while in cases of ankylosed joints the bony adhesions can be seen, also uric acid deposits.

So many cases have been operated upon following a diagnosis made with the X-rays that it is almost superfluous to mention them, but the case of Dr. Wm. J. Morton, of New York, is unique in being the first in America to be operated upon; a needle was located in a woman's foot after having been imbedded for nine years.

Dr. T. S. K. Morton, of Philadelphia, operated upon a patient who had been shot in the forearm a month before; the bullet was never located although a discharging sinus persisted. Dr. Morton had a skiagraph taken of the arm and located the bullet imbedded in the ulna beneath a splinter of bone which had prevented its being detected with a probe. Its removal was easily accomplished.

I have had cases referred to me for the location of bullets. Photographs were taken, the patients sent home to their surgeons along with the photographs, and the bullets removed.

If the wonderful things that have already been accomplished by means of these mysterious rays are any criterion, we may with a considerable degree of certainty look for still more wonderful things in the future. It has been claimed by some observers that the rays have the power to kill bacteria. With this claim in mind, I was enabled to obtain duplicate sets of test tubes containing, as media, potato, agar and glycerine agar. These media were freshly inoculated from cultures of bacillus violaceous, bacillus of anthrax, staphylococcus pyongenes aureus and bacillus coli commune. Immediately after the inoculation one set of tubes was placed in such a position that the rays could pass through their cotton plugs and fall upon the bacteria. They were exposed to the action of the rays for thirty-five minutes, then put away for four days. At the end of this time they were compared with the set of tubes not exposed to the rays. Both sets were found to contain cultures in the most flourishing condition, all of them growing. While this primitive experiment does not prove conclusively that the rays cannot kill all bacteria, it does prove to my satisfaction, at least, that so far as these bacteria are concerned the rays are practically inert.

These observations are in accordance with the

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findings of Delephine and Park, who agree that bacteria are not affected by the rays.

The rays have been projected upon certain types of skin diseases due to bacteria, as instanced by eczema and lupus, and upon trachoma; but with negative results in all cases.

I have taken pictures with the rays of gall stones, kidney and bladder stones, and have found that gall stones offer but little resistance, thus precluding the liability of their being diagnosed by this means. The phosphatic stones offered more and the uric acid the most resistance. This was prettily shown by a photograph of a stone with a dark uric acid nucleus and phosphatic periphery. I do not believe that stones in the bladder or kidney can be located in the body, as they offer but little more resistance to the rays than the flesh itself, and not so much as the bones.

Where before it was impracticable to take many skiagraphs, owing to the necessarily prolonged exposure, now, thanks to Mr. Edison and his fluorescing screen and the improved technique, we are enabled to take pictures in one-fiftieth the time formerly required. I obtained a distinct picture of a forearm in three minutes. This fluorescing screen consists of a thin screen coated with tungstate of calcium and held in direct contact with the sensitized film of the plate, the idea being to get the fluorescing crystals upon the film so that when under the influence of the rays their fluorescence will cause the chemical action in the film which, when the screen is not used, is caused by the comparatively low fluorescence of the silver salts alone.

With the shortening of the time of exposure, with the perfection of the fluorescent screen and "fluorescope," the improved technique and simple apparatus necessary, it is now possible to utilize the rays in ordinary surgical diagnosis, either in the office or hospital, and in so using them we have an agent whose evidence is not to be controverted.

213 New York Life Building.

MIDDLE EAR DISEASE IN RELATION TO DISEASES OF THE NARES AND NASO-PHARYNX.

By J. D. Simpson, M. D.

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In almost all departments of medicine we hear a great deal said and see a great deal written as to the cause or causes of different pathological processes. In every case if the cause can be found, provided it is still operative and capable of safe removal, the principal indication for treatment is to remove said cause, and the next to repair, to as great extent as lies in one's power, the damages produced directly or indirectly by said cause.

It is a fact that in the past with all otologists, and at the present time with many, the chief or only aim in the treatment of diseases of the ear has been or is to repair the damages produced in the ear, with little or no thought of removing the cause.

Many pathological changes in the hearing apparatus respond favorably to treatment very slowly or not at all, but the causes of these changes in the ear are, as a rule, very amenable to treatment.

The middle ear is the part of the ear most often affected by disease. When we consider the intimate connection between the naso-pharynx and middle ear (the nose, throat, Eustachian tube and middle ear being lined with a continuous mucous membrane) it is easy to believe the fact that the majority of diseases of the middle ear arise as the result of some pathological condition of the nasal passages or naso-pharynx, either by an extension of inflammation or infection from the naso-pharynx, or to interference with the proper ventilation of the middle ear through the Eustachian tube. Lennox Brown states as follows: "It is only by daily recognition and acknowledgment of this intimate connection between these three regions—the throat, the nose and the ear—that thorough work can be done in either. The mysteries of the larynx may be confined to the pure laryngologist, as may those of the internal ear to the aurist; but either one or other would be imperfectly explored if the investigator neglected to examine the avenues to and surroundings of these inner and deeply seated structures."

Many acute inflammations of the middle ear are due to an extension of inflammation from the naso-pharynx, but in most of these cases there is a pre-existing chronic affection of the nares or naso-pharynx which causes more or less constant venous hyperæmia of the walls of the middle ear, Eustachian tube and pharynx, thus keeping these parts in a condition in which both the pharynx and middle ear are very susceptible to attacks of acute inflammation. This condition of the middle ear of susceptibility to attacks of acute inflammation is a potent factor, not only in the development of acute otitis media from the extension of inflammation in acute pharyngitis, but also from many other causes, as from cold wind blowing into the ear or from the application of cold water to the membrane of the drum in bathing, etc., and also from infection in the course of the exanthemata. It is a fact that in many cases of chronic purulent inflammation of the middle ear following an acute attack in connection with measles, scarlet fever, or typhoid fever, we find just that condition of the nasal passages or naso-pharynx in which acute attacks of otitis media are apt to occur, and in children I have seen a number of cases of chronic purulent otitis media arising as a complication of

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the exanthemata, after a long course of treatment applied directly to the diseased ears without cure, get well at once after removal of adenoid growths from the vault of the pharynx.

I do not wish to imply that all acute inflammations of the middle ear are caused directly or indirectly by disease of the nares or naso-pharynx, but on account of the large percentage of cases which are known to be due to this cause, I believe that acute inflammation of the middle ear, including the ordinary earache of children, should be regarded as a symptom pointing to an affection of the nares or naso-pharynx, and although appropriate treatment of the acute otitis media must not be neglected, of much more importance in many cases after subsidence of the acute symptoms is the proper treatment of any preëxisting chronic affection of the nasal passages or naso-pharynx, thus preventing often a recurrence of the acute otitis media or its passing into a chronic affection of the middle ear with its consequent pathological changes and deafness, which often cannot be remedied by treatment.

Disease of the nasal passages or naso-pharynx is not only an important factor in the development of acute otitis media as described above, but also causes most of the chronic diseases of the middle ear by causing a disturbance of the ventilation of the middle ear. This may be due to a contraction or closure of the Eustachian tube, from swelling of its mucous membrane, or to viscid secretion blocking up its pharyngeal orifice, or causing an agglutination of its walls. Obstruction of the tube is frequently due to pressure of the surrounding parts upon its orifice. This may result from adenoid growths, from swelling of the posterior extremity of the inferior turbinated body, and also from growths extending into the naso-pharynx from the nasal passages. Obstruction is also caused by defective action of the muscles of the tube and soft palate. Through the normal Eustachian tube air passes freely to the middle ear, when certain muscles contract, as in the act of deglutition, but when these muscles are at rest, as has been shown by Hartmann from his investigations in the pneumatic cabinet, no air passes through the tube into the middle ear under strong air pressure. On the other hand, when the normal air pressure is diminished to only a slight degree, the air is exhausted from the tympanitic cavity. This explains why affections of the middle ear so often arise as a result of narrowing of the nasal passages by growths, hypertrophies, or marked septal deviations. In this condition at each inspiratory effort the air in the pharynx becomes rarified to such an extent as to exhaust by suction the air from the middle ear, thus producing much the same effect in the middle ear as that caused by a narrowing of the Eustachian tube. When the Eustachian tube is obstructed from any cause, the air contained within the middle ear disappears quite rapidly from absorption. Then the external atmospheric pressure being the greater, crowds the drum membrane and ossicles inwards. This condition, if lasting any length of time, gradually produces in the middle ear those pathological changes and deafness known as chronic catarrhal inflammation of the middle ear. These changes may go on very insidiously, and years may elapse before the patient becomes aware of any impairment of his hearing, or the disease may progress much faster, depending largely upon the amount of obstruction in the tube, and whether the obstruction is continuous or at times the tube is patent.

These conditions of the nares or naso-pharynx not only cause middle ear disease as above described, but in many cases of chronic purulent inflammation of the middle ear aggravate the disease by constantly keeping up a venous hyperæmia, often preventing the cure of the otorrhœa, and, if a cure is affected and the purulent discharge stopped, causing, in many cases, frequent relapses to occur.

Adenoid growths in the pharyngeal vault cause fully 50 per cent. of middle ear disease in children. These adenoids become atrophied with increased age, leaving often a non-progressive chronic deafness. As a rule, in middle ear disease, any departure from the normal condition of the nasal passages or naso-pharynx should be dealt with radically. The removal of adenoid growths from the vault of the pharynx, the reduction of any hypertrophic process within the nares, either by chromic acid, the galvanic cautery, or any other suitable remedy, and the actual removal of any obstructive deformity of the septum, or of an extensive hypertrophy of turbinated bodies which has failed to respond to less radical measures, will be necessary in order to prevent repeated attacks of acute inflammation, or the onward progress of a chronic affection of the middle ear.

Space will not permit me to enter into the treatment of diseases of the nose and throat causing middle ear disease, but will simply refer you to the many excellent works on diseases of the nose and throat for the proper treatment.

Out of 4,946 patients treated during one year at the Central London Throat and Ear Hospital only 1,980 were aware that they had any disease of the ear, but, upon examination of the others, nearly 1,000 more were found to be affected by middle ear disease in connection with disease of the nose or throat. This shows how insidiously changes may take place in the hearing apparatus, and emphasizes the importance of carefully testing the hearing of all patients who apply for treatment of diseases of the nose and throat, that proper treatment may be given to any existing affection of the Eustachian tube or middle ear.

It is not enough to simply make a diagnosis of ear disease due to obstruction or narrowing of the

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A. Ortmann, Minneapolis.
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THE NEXT MEETING OF THE SOCIETY
WILL BE HELD IN

MANKATO

ON THE THIRD WEDNESDAY IN JUNE,
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